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Oracle Database 11*g* Product Family

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INTRODUCTION

Oracle Database 11*g* is available in a variety of editions tailored to meet the business and IT needs of all organizations. Oracle also offers several options to Oracle Database 11*g* Enterprise Edition for specific business and IT requirements. This paper outlines the features and options available with each edition of Oracle Database 11*g*.

- Oracle Database 11*g* Standard Edition One delivers unprecedented ease-of-use, power, and price/performance for workgroup, departmental, and web applications on single servers with a maximum of 2 sockets.

- Oracle Database 11*g* Standard Edition is available on single or clustered servers with a maximum capacity of four sockets in total. It includes Oracle Real Application Clusters as a standard feature at no additional cost.

- Oracle Database 11*g* Enterprise Edition is available on single and clustered servers with no socket limitation. It provides efficient, reliable and secure data management for mission-critical transactional applications, query-intensive data warehouses, and mixed workloads.

All editions of Oracle Database 11*g* are built using the same reliable database engine architecture and are completely compatible with each other. They're available on a choice of operating systems and include a common set of application development tools and programming interfaces. Using Oracle Database 11*g* you can start out with Standard Edition One, and as business grows, you can easily upgrade to Standard Edition or Enterprise Edition depending on what best meets your needs. One of the benefits of Oracle is that it's so easy to upgrade -- just install the next edition's software -- you make *no* changes to your database or applications, and get the performance, scalability, reliability, and security for which Oracle is renowned in an easily managed environment.

ENTERPRISE EDITION OPTIONS

Each edition of Oracle Database 11*g* has a common set features and functionality to meet the varying requirements of today's business applications. Additionally, Oracle offers a range of Enterprise Edition Options for more demanding large-scale, mission-critical transaction processing, data warehousing, and other business applications.

Oracle Active Data Guard

Oracle Active Data Guard—an option for Oracle Database 11*g* Enterprise Edition—enhances Quality of Service and improves the utilization of redundant hardware by offloading resource-intensive activities from a production database to one or more synchronized standby databases. Oracle Active Data Guard enables read-only access to a physical standby database for queries, sorting, reporting, web-based access, etc., while continuously applying changes received from the production database. In addition, Oracle Active Data Guard can enable a standby database to be opened and used for testing purposes and then quickly reverted back to a viable standby for disaster recovery. No changes to the production database are lost during testing. Oracle Active Data Guard also enables the use of fast incremental backups when offloading backups to a standby database, and can provide additional benefits of high availability and disaster protection against planned or unplanned outages at the production site.

Oracle Advanced Compression

Oracle Advanced Compression—with Oracle Database 11*g* Enterprise Edition—helps you manage your growing amounts of data (that on average are tripling every couple of years) in a cost effective manner. Oracle Advanced Compression compresses any type of data, including structured and unstructured data such as documents, images, and multimedia, as well as network traffic and data in the process of being backed up. As a result, Oracle Advanced Compression helps you use resources more efficiently and lower storage costs.

Oracle Advanced Security

Oracle Advanced Security provides transparent data encryption of data stored in the database and network encryption for data traveling across the network. In addition it provides a complete suite of strong authentication services to the Oracle Database. Network encryption is implemented using industry-standard data encryption and data integrity algorithms. This option provides a choice of algorithms and cipher strengths for deployment. Strong authentication services support a comprehensive suite of industry-standard third-party authentication options. The authentication options include single sign-on services to the Oracle Database by

interoperating with existing authentication frameworks and two-factor authentication choices such as smart cards and token cards.

Oracle Database Vault

Oracle Database Vault controls the who, when, and where of data and applications that can be accessed—protecting your business against the most common security threat: malicious internal users. Enforcing separation of duties, even among administrators, Oracle Database Vault additionally serves as a powerful preventive control to help meet or exceed today's stringent compliance and privacy requirements. It achieves this by controlling access to application and database data, even by super-users and other highly privileged users. It also enforces multi factor authorization via flexible business rules and tracks who is accessing what and when via out-of-the-box security reports. New internal control requirements found in regulations can be difficult and expensive to implement in an environment with multiple applications. Oracle Database Vault, enables access controls to be transparently applied underneath existing applications. Users can be prevented from accessing specific application data, or from accessing the database outside of normal hours; separation-of-duty requirements can be enforced for different Database Administrators without a costly least privilege exercise.

Oracle Data Mining

Oracle Data Mining enables customers to produce actionable predictive information and build integrated business intelligence applications. Using data mining functionality embedded in Oracle Database 11*g*, customers can find patterns and insights hidden in their data. Application developers can quickly automate the discovery and distribution of new business intelligence—predictions, patterns and discoveries—throughout their organization.

Oracle In-Memory Database Cache

Oracle In-Memory Database Cache enables you to improve application transaction response times and throughput by caching performance-critical subsets of an Oracle Database in the application tier. Automatic data synchronization between the cache and the Oracle Database ensures data consistency. By bringing data closer to the application and processing queries in an in-memory database, your applications are able to access, capture, or update information many times faster. The Oracle In-Memory Database Cache (IMDB Cache) option of Oracle Database 11*g* caches and processes data in the memory of the applications themselves; off-loading the data processing to middle tier resources. Any network latency between the middle tier and the back-end database is removed from the transaction path, with the result that individual transactions can often be executed up to 10 times faster. This is particularly useful where very high rates of transaction processing is required, such as those found under market trading systems, Telco switching systems, and Real Time manufacturing environments. All data in the middle tier is fully protected through local recovery, and asynchronous posting to the back end Oracle Database.

With Oracle Database 11*g*, the ability to transparently deploy IMDB Cache with existing Oracle applications becomes much easier – with common data types, SQL and PL/SQL support, and native support for the Oracle Call Interface (OCI).

The Oracle In-Memory Database Cache option of Oracle Database Enterprise Edition is based on the Oracle TimesTen In-Memory Database.

Oracle Label Security

Oracle Label Security adds extensive protection for sensitive information. It delivers multilevel security capabilities to protect access to data right down to individual rows in tables and addresses the real world data security and privacy problems faced by government and commercial entities worldwide. Oracle Label Security can be combined with Virtual Private Database, Secure Application Roles, and Oracle Database Vault to provide powerful solutions for protecting personally identifiable information.

Oracle OLAP

The Oracle OLAP option is a full-featured on-line analytical processing (OLAP) server embedded within the Oracle Database. The Oracle OLAP option can be used to improve SQL-based business intelligence tools and applications by improving query performance and enriching them with analytic content. As an OLAP solution that is deeply embedded in the Oracle Database, the Oracle OLAP option allows centralized management of data and business rules in a secure, scalable and enterprise-ready platform.. New in Oracle Database 11*g* is support for OLAP-based materialized views which can replace the need to replace, perhaps thousands of materialized views into a single, easy-to-manage OLAP cube that is highly compressed and provides efficient update capabilities.

Oracle Partitioning

Oracle Partitioning enhances the data management environment for OLTP, data marts, and data warehouse applications by adding significant manageability, availability, and performance capabilities to large underlying database tables and indexes. Oracle Partitioning permits large tables to be broken into individually managed smaller pieces, while retaining a single application-level view of the data. A comprehensive variety of partitioning methods are supported including, the ability to allow very large tables (and their associated indexes) to be partitioned into smaller, more manageable units, providing a "divide and conquer" approach to very large database management. Partitioning also improves performance, as the optimizer will prune queries to only use the relevant partitions of a table or index in a lookup. Oracle Partitioning can also manage the lifecycle of information, eliminating the need to continually buy high-end storage confining data growth to a scalable, low-end storage solution.

Oracle RAC One Node

Oracle RAC One Node is the one-node version of Oracle Real Application Clusters (Oracle RAC). It enables customers to standardize on a single deployment model for all their database needs. Oracle RAC One Node makes the database highly available in the presence of computer hardware failures, software failures, or planned software maintenance events. In the event of failures, the database instance is restarted on an available server in the cluster and the client connections are moved to the new instance. Oracle RAC One Node can be online upgraded to full Oracle RAC (RAC license required) in order to scale to multiple servers.

Oracle Real Application Clusters

Oracle Real Application Clusters (RAC) harnesses the processing power of multiple, interconnected servers on a cluster; allows access to a single database from multiple servers on a cluster, insulating both applications and database users from server failures, while providing performance that scales out on-demand at low cost; and is a vital component of grid computing that allows multiple servers to access a single database at one time. Oracle Database 11*g* also includes Automated Storage Management (ASM) and Oracle Clusterware. Combining the use of ASM and Oracle Clusterware virtualizes storage, database servers, application servers, holistic management, and all the other aspects related to deploying and managing a virtualized IT environment.

Oracle Real Application Testing

Agile businesses want to be able to quickly adopt new technologies, whether it's operating systems, servers, or software, to help them stay ahead of the competition. However, change often introduces a period of instability into mission-critical IT systems. Oracle Real Application Testing—with Oracle Database 11*g* Enterprise Edition—allows businesses to quickly adopt new technologies while eliminating the risks associated with change. Oracle Real Application Testing combines a workload capture and replay feature with an SQL performance analyzer to help you test changes against real-life workloads, then helps you fine-tune them before putting them into production.

Oracle Spatial

Oracle Spatial allows users and application developers to seamlessly integrate their spatial data into enterprise applications. Oracle Spatial facilitates analysis based on the spatial relationships of associated data, like the proximity of store locations to customers within a given distance and sales revenue per territory. Oracle Spatial manages spatial data in an industry-standard database, resulting in application integration that takes place at the data server. This enables vendor tools and applications to access spatial data directly from the Oracle Database, providing interoperability and minimizing costs.

Oracle Total Recall

Oracle Total Recall provides the ability to transparently track and archive historical changes to all data stored in an Oracle database. History data is stored in a secure and highly optimized storage and can be accessed in a seamless manner using Flashback Queries. Oracle Total Recall, provides a solution for the retention of historical information. With Oracle Total Recall, all changes made to data are kept to provide a complete change history of information. This means that auditors can not only see who did what when, but they can also see what the actual information was at the time – something that previously has only be available by building into the application, or by expensive backup retention policies. In addition, Oracle Total Recall provides for easier manageability by automating purge of historical data based on specified retention policy. History tracking is non-intrusive and transparent to applications.

DATABASE MANAGEMENT PACKS

Oracle provides an integrated management solution for managing Oracle database with a unique top-down application management approach. With new self-managing capabilities, Oracle eliminates time-consuming, error-prone administrative tasks, so database administrators can focus on strategic business objectives instead of performance and availability fire drills.

Oracle Change Management Pack

The Oracle Change Management Pack enables database administrators to make complex changes to schema objects safely, track changes to schemas and databases over time, make copies of schemas or objects, and compare and synchronize schemas and databases. With Oracle Change Management, you can also propagate object definitions to one or more sites, clone schema objects with a subset of the data, and plan schema changes over the life of the database and its applications.

Oracle Configuration Management Pack

The Oracle Configuration Management Pack enables database administrators to track hardware and software configuration information for host computers and databases managed by Enterprise Manager. That information can then be browsed, searched, compared, exported, and tracked historically. The pack also offers policy management and patch management capabilities based on the configuration information. Finally, to facilitate deployments, cloning functionality for both the Oracle software as well as any associated databases is also provided A key benefit is provided with the ability to compare the configuration of two databases, for faster problem resolution.

Oracle Data Masking Pack

The Oracle Data Masking Pack allows organizations to share production data in test environments with application developers or software testers without violating privacy or confidentiality policies. The Data Masking Pack, a member of Enterprise Manager family of database manageability solutions, helps DBAs and information security administrators replace sensitive data with realistic but scrubbed data based on masking rules.

Oracle Diagnostic Pack

The Oracle Diagnostic Pack provides automatic performance diagnostic and advanced system monitoring functionality. The Diagnostic Pack includes the following features: • Automatic Workload Repository • Automatic Database Diagnostic Monitor (ADDM) • Performance monitoring (database and host) • Event notifications: notification methods, rules, and schedules • Event history and metric history (database and host) • Blackouts

Oracle Provisioning and Patch Automation Pack

The Oracle Provisioning Pack automates deployment of software, applications and patches. This pack provides for bare metal provisioning of operating systems and software images, including automated patching for Oracle products and the operating system, a Critical Patch Facility, database, Real Application Clusters, application provisioning, and one-click single instance to RAC conversions.

Oracle Tuning Pack

The Oracle Tuning Pack provides database administrators with expert performance management for the Oracle environment, including SQL tuning and storage optimizations. In order to use the Tuning Pack, you must also have the Diagnostic Pack. The Tuning Pack includes the following features:

- SQL Access Advisor
- SQL Tuning Advisor
- SQL Tuning Sets
- Reorganize objects

RELATED PRODUCTS

Oracle Audit Vault

Oracle Audit Vault is an enterprise-class audit consolidation and management solution that enables organizations to simplify compliance reporting, proactively detect threats, reduce costs, and secure audit data. Faced with numerous regulatory mandates and increasing concerns about insider threats, organizations are utilizing database audit data as an important security measure, enforcing the trust-but-verify principle. Oracle Audit Vault delivers an in-depth and comprehensive view of audit data pulled from the database, helps to ensure the integrity of this information, and can reduce the cost of compliance by making it easier for auditors and security personnel to manage and report on this data.

Oracle Exadata Storage Server

When dealing with very large databases, queries still need to read data off disk, and then process it as quickly as possible. Over the last few years it has become apparent that I/O subsystem speed and bandwidth has become a major performance bottleneck for large-scale data warehouses. Even while processor speeds have increased exponentially, existing storage solutions have not seen the same increase in throughput. To solve this problem, Oracle introduced Oracle Exadata Storage Server, an intelligent storage solution that dramatically improves query processing.

An Oracle Exadata Storage server consists of 12 drives, 2 Intel processors each with 4 cores, and two InfiniBand cards. Oracle Exadata Software runs on each server, which allows queries to be off-loaded from the database server to the storage server. Each server can scan about 1 GB/sec of data, and can be stacked together to deliver additional capacity and bandwidth. Query offloading happens transparently to the Oracle Database, allowing these intelligent storage servers to be easily introduced into existing environments.

Oracle Database Machine

The Oracle Database Machine is a preconfigured data warehouse server and storage grid. It consists of 14 Oracle Exadata Storage Servers and 8 Oracle Real Application Cluster servers, in a single rack, complete with switches and power supplies, offering up to 168 TB of storage, with a data scan rate of 14GB/sec. The Oracle Database Machine has revolutionized data warehousing performance, with customers reporting at least 10x query performance improvements over their existing environments. The hardware cost is also much lower than alternative environments. An Oracle Database Machine has a retail hardware price of around $650,000, whereas an equivalent configuration using high-end SMP and Storage Arrays would cost closer to $8 million dollars, and deliver less performance.

Oracle Secure Backup

Oracle Secure Backup, Oracle's new tape backup management software, delivers secure, high performance network tape backup for Oracle databases and file systems. It provides an integrated, easy-to-use backup solution that encrypts data to tape to safeguard against the misuse of sensitive data in the event that backup tapes are lost or stolen. Oracle Secure Backup provides optimized backup performance of Oracle Databases via tight integration with the database engine, as well as advanced backup functionality including automated tape rotation, known as "vaulting".

CONCLUSION

In the Oracle Database family of products, there's an edition to fit all business needs, providing the necessary foundation to successfully deliver more information with higher quality of service, and to efficiently manage change within the environment to deliver better value.

By deploying any edition in the Oracle Database 11*g* family within their IT architecture, businesses can look to leverage the full power of the world's leading database to reduce their hardware and storage costs; improve their system performance by a; dramatically simplify their software portfolio; double the productivity of their IT personal, and quarter the time taken to realize business value.

Feature and Option Availability Matrix

The following table outlines the database features and options associated with each edition of Oracle Database 11*g*.

FEATURE/OPTION	SE1	SE	EE	NOTES
HIGH AVAILABILITY				
Oracle Data Guard – Redo Apply	N	N	Y	
Oracle Data Guard – SQL Apply	N	N	Y	
Oracle Data Guard—Snapshot Standby	N	N	Y	
Oracle Active Data Guard	N	N	Y	Enterprise Option (Active Data Guard)
Oracle Data Guard – Network Compression	N	N	Y	Enterprise Option (Advanced Compression Option)
Basic Standby Database (Manually managed)	Y	Y	Y	
Rolling Upgrades – Patch Set, Database and O/S	N	N	Y	
Fast-Start Fault Recovery	N	N	Y	
Online index rebuild	N	N	Y	
Online index-organized table reorganization	N	N	Y	via ALTER TABLE MOVE ONLINE
Online table redefinition	N	N	Y	via DBMS_REDEFINITION
Online system changes – CPU, disk, memory	Y	Y	Y	
Flashback Query	Y	Y	Y	
Flashback Table	N	N	Y	
Flashback Database	N	N	Y	
Flashback Transaction	N	N	Y	
Flashback Transaction Query	N	N	Y	
Flashback Data Archive ("Oracle Total Recall")	N	N	Y	Enterprise Option
Block Level Media Recovery	N	N	Y	
Online Backup and Recovery	Y	Y	Y	
Incremental Backup and Recovery	Y	Y	Y	EE only: fast incremental backups available via change tracking
Unused Block Compression in Backups	N	N	Y	

Parallel Backup and Recovery	N	N	Y	
Default RMAN Compression (BZIP2)	Y	Y	Y	
Fast RMAN Compression (ZLIB)	N	N	Y	Enterprise Option (Advanced Compression Option)
Point-in-time Tablespace Recovery	N	N	Y	
Trial Recovery	N	N	Y	
Oracle Fail Safe	Y	Y	Y	Windows only
Data Recovery Advisor	Y	Y	Y	
Transaction Application Failover	Y	Y	Y	
PERFORMANCE & SCALABILITY				
Oracle Real Application Clusters	N	Y	Y	Enterprise Option, and included with SE
Oracle Clusterware	Y	Y	Y	
Automatic Workload Management	N	Y	Y	Requires RAC
Support for Oracle Exadata Storage Server	N	N	Y	
In-Memory Database Cache	N	N	Y	Enterprise Option
Security	N	N	Y	
Oracle Advanced Security	N	N	Y	Enterprise Option
Oracle Label Security	N	N	Y	Enterprise Option
Data Masking Pack	N	N	Y	Enterprise Option
Encryption Toolkit	Y	Y	Y	
Fine Grained Auditing	N	N	Y	
DEVELOPMENT PLATFORM				
Java Support	Y	Y	Y	
Database Web Services	Y	Y	Y	
SQLJ	Y	Y	Y	
JDBC Drivers	Y	Y	Y	
XML Support in Database	Y	Y	Y	Includes Binary XML, XML Object-Relational, XML Index, XML Repository
XQuery	Y	Y	Y	
Objects and Extensibility	Y	Y	Y	
Regular Expressions	Y	Y	Y	
PL/SQL Stored Procedures and Triggers	Y	Y	Y	
PL/SQL Server Pages	Y	Y	Y	

Java Server Pages	Y	Y	Y	
Java Native Compilation	Y	Y	Y	
PL/SQL Native Compilation	Y	Y	Y	
PL/SQL Function Result Cache	N	N	Y	
Client Side Query Cache	N	N	Y	
Oracle Developer Tools for Visual Studio Net	Y	Y	Y	Windows Only
Microsoft Distributed Transaction Coordinator Support	Y	Y	Y	Windows Only
Active Directory Integration	Y	Y	Y	Windows Only
Native .NET Data Provider – ODP.NET	Y	Y	Y	Windows Only
.NET Stored Procedures	Y	Y	Y	Windows Only
Globalization Support	Y	Y	Y	
Application Express	Y	Y	Y	
SQL*Plus	Y	Y	Y	
SQL Developer	Y	Y	Y	
MANAGEABILITY				
Oracle Change Management Pack	N	N	Y	Enterprise Option
Oracle Configuration Management Pack	N	N	Y	Enterprise Option
Oracle Diagnostic Pack	N	N	Y	Enterprise Option
Oracle Tuning Pack	N	N	Y	Enterprise Option
Oracle Provisioning and Patch Automation Pack	N	N	Y	Enterprise Option
Fast, Lightweight Server Install	Y	Y	Y	
Easy Client Install	Y	Y	Y	
Oracle Enterprise Manager – Database Control	Y	Y	Y	
Automatic Memory management	Y	Y	Y	
Automatic Storage management	Y	Y	Y	
Automatic Undo management	Y	Y	Y	
Automatic Statistics management	Y	Y	Y	
Server Managed Backup and Recover (RMAN)	Y	Y	Y	
Automatic Backup/Recovery to Flash Recovery Area	Y	Y	Y	
Duplexed Backup Sets	N	N	Y	
Server-Generated Alerts	Y	Y	Y	
End-to-End Application Testing	Y	Y	Y	
Database Resource Manager	N	N	Y	
SQL Plan Manager	N	N	Y	
Resumable Space Allocation	Y	Y	Y	
VLDB, DATA WAREHOUSING, BUSINESS INTELLIGENCE				
Oracle Partitioning	N	N	Y	Enterprise option

Oracle OLAP	N	N	Y	Enterprise option
Oracle Data Mining	N	N	Y	Enterprise option
Direct Load Data Compression	N	N	Y	
OLTP Compression	N	N	Y	Enterprise Option (Advanced Compression Option)
SQL Analytics Functions	Y	Y	Y	
Bitmapped index and Bitmapped Join Index	N	N	Y	
Function-Based Index	Y	Y	Y	
Parallel Query/DML	N	N	Y	
Parallel Statistics Gathering	N	N	Y	
Parallel Index Build/Scans	N	N	Y	
Parallel Data Pump Export/Import	N	N	Y	SE Non-Parallel Data Pump only
Data Pump Compression	N	N	Y	Enterprise Option (Advanced Compression Option)
Export Transportable Tablespace, including Cross-Platform	N	N	Y	
Import Transportable Tablespace	Y	Y	Y	
Star Query Transformation	Y	Y	Y	SE B-Tree Indexes Only
Sample Scan	Y	Y	Y	
Summary Management – Materialized View Creation and Refresh	Y	Y	Y	
Summary Management – Materialized View Query Rewrite	N	N	Y	
Direct Path Load API	Y	Y	Y	
External Tables	Y	Y	Y	
SQL Model	Y	Y	Y	
Synchronous Change Data Capture	Y	Y	Y	
Asynchronous Change Data Capture	N	N	Y	
Query Rewrite Cache	N	N	Y	
INTEGRATON				
Oracle Streams	Y	Y	Y	SE1/SE no Asynchronous Capture from Log File (Online Redo or Archive)
Oracle Streams Advanced Queuing	Y	Y	Y	
Messaging Gateway	N	N	Y	
Basic Replication	Y	Y	Y	Read only and

				updateable materialized views. Also single master for updateable MVs and multi-tier MVs.
Advanced replication	N	N	Y	Multi-Master Replication
Distributed Queries/Transactions	Y	Y	Y	
Job Scheduler	Y	Y	Y	
External Procedures	Y	Y	Y	
Generic Connectivity	Y	Y	Y	
Transparent Gateways	Y	Y	Y	Licensed separately for SE/EE
NETWORKING				
Connection Pooling	Y	Y	Y	
Oracle Connection manager	N	N	Y	
Infiniband Support	N	N	Y	
CONTENT				
Oracle Spatial	N	N	Y	Enterprise Option
Semantic Technologies (RDF/OWL)	N	N	Y	Requires Spatial, Advanced Compression and Partitioning Options
Oracle Locator	Y	Y	Y	
Oracle Workspace manager	Y	Y	Y	
Medial Images (DICOM)	Y	Y	Y	
Multimedia	Y	Y	Y	
Oracle Text	Y	Y	Y	
SecureFiles	Y	Y	Y	Compression, deduplication are part of an Enterprise Option (Advanced Compression Option). Encryption is part of an Enterprise Option (Advanced Security Option)
ADDITIONAL DATABASE FEATURES				
Database Event Triggers	Y	Y	Y	
Drop Column	Y	Y	Y	

Rename Column, Constraint	Y	Y	Y	
Virtual Column	Y	Y	Y	Use of virtual columns as primary keys or foreign keys require EE and Oracle Partitioning Option
Invisible Indexes	Y	Y	Y	
Index-Organized Tables	Y	Y	Y	
Instead-of Triggers	Y	Y	Y	
LOB (Large Object) Support	Y	Y	Y	
LogMiner	Y	Y	Y	
Multiple Block Size Support	Y	Y	Y	
Temporary Table	Y	Y	Y	

Oracle reserves the right to make changes to the contents of this paper at a later date.

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