ORACLE 12*c*
DATABASE

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Oracle Database 12*c* Product Family

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Introduction

Oracle Database 12*c* is available in a variety of editions tailored to fit different sizes of organizations, and several Enterprise Edition only options are available for specific business and IT requirements. This paper outlines the features available with each edition of Oracle Database 12*c*, and the options available for Oracle Database 12*c* Enterprise Edition.

- Oracle Database 12*c* Standard Edition One (SE1) 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 12*c* Standard Edition (SE) 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 12*c* Enterprise Edition (EE) 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.

Oracle Database 12*c* introduces a new architecture featuring Oracle Multitenant that simplifies the process of consolidating databases onto the cloud. It delivers all the benefits of managing many databases as one, yet retains the data isolation and resource prioritization of separate database.

All editions of Oracle Database 12*c* are built using the same code base and are completely compatible with each other. Oracle Database 12*c* is available on a choice of operating systems and includes a common set of application development tools and programming interfaces. Customers can start out with Standard Edition One, and as business grows or depending on changing requirements, easily upgrade to Standard Edition or Enterprise Edition. It's simple 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.

As a longtime Oracle Database user, I'm excited about Oracle Database 12*c*'s Oracle Multitenant. This important new feature will allow users to create a container database and simply plug in multiple databases driving down cost of ownership while simultaneously increasing productivity.

Daniel A. Morgan, Oracle ACE Director

Enterprise Edition Options

Each edition of Oracle Database 12*c* 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, cloud-computing, mission-critical transaction processing, big data, and other business applications.

Oracle Active Data Guard

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. Oracle Active Data Guard 12c includes Global Data Services, Far Sync, Fast Sync, Real-time cascading, and DML on Global Temporary Tables. 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.

Advanced Analytics

Oracle Advanced Analytics empowers data and business analysts to extract knowledge, discover new insights and make predictions—working directly with large data volumes in the Oracle Database. Oracle Advanced Analytics provides a comprehensive advanced analytics platform through a combination of powerful in-database algorithms and open source R algorithms. Analytic capabilities are accessible via SQL and R languages, and through the SQL Developer extension or open-source R clients. Together, these features enhance the database with a comprehensive range of analytical functionality for data mining, text mining and predictive analytics, summary and descriptive statistics, exploratory data analysis and graphics, comparative statistics, correlations, univariate and multivariate statistics, and advanced numerical computations.

Oracle Advanced Compression

Oracle Advanced Compression—with Oracle Database 12*c* Enterprise Edition—helps you manage your growing amounts of data (that on average are tripling every couple of years) in a cost effective manner. The new Heat Map feature tracks access to tables, partitions, and individual blocks to provide deep insight into how your data is accessed by applications and end users. The new Automatic Data

Optimization feature uses simple policies you create that trigger automatic movement of tables, partitions, and entire table spaces that allow you to determine the level of compression over time. 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 and Information Life Cycle Management (ILM) capabilities help you use resources more efficiently and lower storage costs.

Oracle Advanced Security

Oracle Advanced Security helps you protect sensitive information and comply with various privacy and compliance regulations including breach notification laws and the Payment Card Industry Data Security Standard (PCI-DSS) by enabling encryption inside the database that is transparent to applications and enabling redaction of sensitive data before it leaves the database.

Oracle Advanced Security provides two primary security features: Transparent Data Encryption and Data Redaction. Data Redaction is new in Oracle Advanced Security with the release of Oracle Database 12*c* and provides the ability to redact sensitive information such as credit card data and social security numbers before the information leaves the database and is displayed by applications. Transparent Data Encryption provides encryption of data stored in the database, exported from the database using DataPump, or disk-based backups using Oracle RMAN.

Oracle Database Vault

Oracle Database Vault helps organizations increase the security of existing applications and address regulatory mandates that call for separation-of-duties, least privilege and other preventive controls to ensure data integrity and data privacy. Oracle Database Vault proactively protects application data stored in the Oracle database from being accessed by privileged database users. Oracle Database Vault lets you control who, when, and where the database and application data can be accessed—helping protect your business against the most common security threats that target privileged user accounts or attempt to bypass applications. Enforcing separation of duties, even among administrators, Oracle Database Vault additionally serves as a powerful preventive control to help comply with today's stringent compliance and privacy requirements.

Oracle TimesTen Application-Tier Database Cache

Oracle TimesTen Application-Tier Database Cache (TimesTen Cache) enables you to improve application transaction response times and throughput by caching performance-critical subsets of an Oracle Database in the application tier. The

TimesTen Cache option of Oracle Database 12c brings hot data closer to the applications by processing SQL transactions at memory speed and off-loading the data processing to the middle tier resources. With Oracle Database 12c, the ability to transparently deploy TimesTen Cache with existing Oracle database applications becomes much easier – with common data types, SQL and PL/SQL support, and native support for the Oracle Call Interface (OCI), JDBC, ODP.NET, and ODBC.

Oracle Label Security

Oracle Label Security adds extensive protection for sensitive information. This option employs labeling concepts used by government, defense, and commercial organizations to protect sensitive information and provide data separation. 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 Multitenant

Oracle Multitenant – an option of Enterprise Edition – a new architecture in Oracle Database 12c delivers the highest level of database consolidation, without changes to existing applications. Oracle Multitenant address historical DBA pain points: provisioning, patching, and consolidation. This new architecture makes it easy to create a container database and simply plug-in multiple databases working seamlessly with existing Oracle Database options, such as RAC and Active Data Guard. Oracle Multitenant reduce IT costs and provide the ability to manage many databases as one, and retain the isolation of separate databases, without the need to change any applications or access rights.

Oracle On-Line Analytical Processing (OLAP)

Oracle OLAP delivers advanced multidimensional analytic capabilities within Oracle Database 12*c*. It's designed to provide excellent query performance, fast incremental updates of data sets, efficient management of summary data, and rich analytic content. 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. Oracle Database 12*c* 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 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 12*c* 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 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 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 12*c* 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 and Graph

Oracle Spatial and Graph includes advanced features for spatial data management and analysis as well as graphs for physical, network, and social and linked data applications. The geospatial data features are designed to support the most complex requirements found in Geographic Information Systems (GIS), enterprise applications and location services applications. It extends the Locator spatial query and analysis features in Oracle Database with more advanced spatial analysis and processing capabilities. It provides support for two graph data models: Network Data Model graph (NDM), and RDF Semantic Graph. NDM is used to model and analyze physical and logical networks used in industries such as transportation, logistics, andutilities.RDF Semantic Graph supports the World WideWeb Consortium (W3C) Resource Description Framework(RDF) standards. It provides RDF data management, querying and inferencing that are commonly used in a variety of applications ranging from semantic data integration, to social network analysis and linked open data applications.

Adaptive Execution Plans in Oracle Database 12*c* builds on the monitoring of SQL execution times using Adaptive Cursor Sharing to automatically provide faster and more consistent SQL execution times!

Dan Hotka, Oracle ACE Director

Manageability

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 Cloud Management Pack for Oracle Database

Oracle Cloud Management Pack for Oracle Database helps to set up a Database Cloud and operate the Database as a Service model. Some of the features provided by this pack are: Self-service database provisioning on physical infrastructure; Support for both single instance and Real Application Clusters (RAC) configuration; Policy-driven resource management, such as scale out and scale back of compute power; Metering and chargeback based on fixed cost, utilization metrics and configuration parameters of the database and the underlying infrastructure; and Programmatic access to the Self-Service Portal.

Oracle Data Masking Pack for Oracle and Non-Oracle Databases

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 Database Lifecycle Management Pack for Oracle Database

The Database Lifecycle Management Pack is a comprehensive solution that helps database, system and application administrators automate the processes required to manage the Oracle Database Lifecycle. It eliminates manual and time consuming tasks related to discovery, initial provisioning, patching, configuration management, ongoing change management and Disaster protection automation. In addition the Database Lifecycle Management pack provides compliance frameworks for reporting and management of industry and regulatory compliance standards.

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; and Event history and metric history (database and host).

Oracle Test Data Management Pack for Oracle and Non-Oracle Databases

Oracle Test Data Management Pack helps enterprises shrink storage costs by creating reduced size copies of production data for application development, training and testing while maintaining the referential integrity of the data set. Through data discovery and application modeling, Oracle Test Data Management Pack automatically enforces complex business rules of enterprise applications resulting in accurate subsets of production data.

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

Airline Data Model

The Oracle Airline Data Model is a standards-based, industry-specific, prebuilt data warehouse database schema with associated analytic models and dashboards. Leveraging Oracle's strong airline domain expertise, and Oracle's deep expertise in data warehousing, Oracle Airline Data Model provides a foundation schema that is modern, relevant, topical, and addresses the key passenger data management needs of low cost carriers and traditional airlines.

Communications Data Model

Oracle Communications Data Model is a prebuilt, standards-based data warehouse designed and pretuned for Oracle database and hardware, including the Sun Oracle Database Machine. Oracle Communications Data Model combines market-leading communications application knowledge with the performance of Oracle's database and business intelligence platforms. Oracle Communications Data Model can be used in any application environment and is easily extendable. With it, you can jump-start the design and implementation of a communications data warehouse to quickly achieve a positive return on investment (ROI) for your data warehousing and business intelligence project with a predictable implementation effort.

Oracle Audit Vault and Database Firewall

Oracle Audit Vault and Database Firewall monitors Oracle and non-Oracle database traffic to detect and block threats, as well as improves compliance reporting by consolidating audit data from databases, operating systems, directories, and other sources.

Oracle Big Data Appliance

Oracle Big Data Appliance is an engineered system optimized for acquiring, organizing, and loading unstructured data into Oracle Database. It combines optimized hardware components with new software solutions to deliver the most complete big data solution.

Oracle Big Data Connectors

Oracle Big Data Connectors is a suite of software designed to integrate Apache Hadoop with Oracle software including Oracle Database, Oracle Endeca Information Discovery and Oracle Data Integrator.

Oracle Cloud File System

Oracle Cloud File System combines a dynamic volume manager and cluster file system with integrated data services to help consolidate general purpose and database files in a cloud infrastructure and reduce storage management complexity. Oracle Cloud File System includes Automatic Storage Management Dynamic Volume Manager and Automatic Storage Management Cluster File System with Advanced

Data Services for managing all database files, business data, application binaries and personal data in a cloud infrastructure.

Oracle Database Appliance

The Oracle Database Appliance is a new way to take advantage of the world's most popular database—Oracle Database 12*c*—in a single, easy-to-deploy and manage system. It's a complete package of software, server, storage, and networking that's engineered for simplicity; saving time and money by simplifying deployment, maintenance, and support of database workloads.

Oracle Database Mobile Server

Oracle Database Mobile Server is a powerful tool for controlling networks of mobile or embedded devices from a centralized management console. It provides a secure, scalable method for connecting applications running locally on mobile or embedded devices to an Oracle enterprise backend. The synchronization system is robust and fault tolerant. It is able to successfully synchronize over unreliable or intermittently available networks. Oracle Database Mobile Server provides management for applications, users, and devices.

Oracle Exadata

The Oracle Exadata Database Machine is engineered to be the highest performance and most available platform for running the Oracle Database. Built using industry and intelligent database and storage software Exadata Database Machine delivers extreme performance for all types of database workloads including Online Transaction Processing (OLTP), Data Warehousing (DW) and consolidation of mixed workloads. Simple and fast to implement, the Exadata Database Machine is ready to tackle your largest and most important database applications.

Oracle Programmer

Oracle Programmer is a separate Oracle product that provides a programmatic interface to any edition of Oracle Database for application programmers. Programmer provides a rich set of interfaces for developers who build enterprise applications that access and manipulate Oracle Database. This product is licensed separately from the Oracle Database products. Oracle Programmer is a family of the following products: Embedded SQL-style interfaces: Pro*C/C++, Pro*COBOL, Pro*Fortran, SQL*Module for Ada, SQLJ; and Utilities to generate host-language bindings from database schemas: Object Type Translator and JPub.

Oracle Secure Backup

Oracle Secure Backup is a centralized tape backup management solution providing high performance, heterogeneous data protection in distributed UNIX, Linux, Windows, and Network Attached Storage (NAS) environments. Protecting file-system and Oracle Database data, Oracle Secure Backup provides a complete tape backup solution for your IT environment. In addition to tape backup, Oracle Secure Backup delivers an integrated Oracle Database backup to third-party cloud (Internet) storage, through the Oracle Secure Backup Cloud Module.

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 12*c* 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.

Table 1-1 Feature Availability for Oracle Database Editions

Feature/Option	SE1	SE	EE
Consolidation			
Multitenant	N	N	Y
Snapshots and Cloning			
Storage Snapshot Optimization	N	N	Y
High Availability			
Application Continuity	N	N	Y
Oracle Fail Safe	Y	Y	Y
Oracle RAC One Node	N	N	Y
Oracle Data Guard—Redo Apply	N	N	Y
Oracle Data Guard—Far Sync Standby	N	N	Y
Oracle Data Guard—SQL Apply	N	N	Y
Oracle Data Guard—Snapshot Standby	N	N	Y
Oracle Data Guard—Real-Time Cascading Standbys	N	N	Y
Oracle Active Data Guard	N	N	Y
Rolling Upgrades—Patch Set, Database, and Operating System	N	N	Y
Simple Database Rolling Upgrades using Standby	N	N	Y
Online index rebuild	N	N	Y
Online index-organized table organization	N	N	Y
Online table redefinition	N	N	Y
Duplexed backup sets	N	N	Y
Block change tracking for fast incremental backup	N	N	Y
Unused block compression in backups	N	N	Y
Block-level media recovery	N	N	Y
Lost Write Protection	N	N	Y
Automatic Block Repair	N	N	Y
Parallel backup and recovery	N	N	Y
Tablespace point-in-time recovery	N	N	Y
Trial recovery	N	N	Y
Fast-start fault recovery	N	N	Y
Flashback Table	N	N	Y
Flashback Database	N	N	Y

Feature/Option	SE1	SE	EE
Flashback Transaction	N	N	Y
Flashback Transaction Query	N	N	Y
Uncompressed Flashback Data Archive	Y	Y	Y
Online Datafile Move	N	N	Y
Transaction Guard	N	N	Y
Cross-platform Backup and Recovery	N	N	Y
Global Data Services	N	N	Y
Scalability			
Oracle Real Application Clusters	N	Y	Y
Automatic Workload Management	N	Y	Y
Quality of Service Management	N	N	Y
Performance			
Client Side Query Cache	N	N	Y
Query Results Cache	N	N	Y
PL/SQL Function Result Cache	N	N	Y
TimesTen Application-Tier Database Cache	N	N	Y
Database Smart Flash Cache	N	N	Y
Support for Oracle Exadata Storage Server Software	N	N	Y
Adaptive Execution Plans	N	N	Y
Concurrent Execution of UNION and UNION ALL Branches	N	N	Y
Security			
Oracle Advanced Security	N	N	Y
Oracle Label Security	N	N	Y
Oracle Database Vault	N	N	Y
Fine-grained Auditing	N	N	Y
Virtual Private Database	N	N	Y
Enterprise User Security	N	N	Y
Real Application Security	N	N	Y
Redaction	N	N	Y
Privilege Analysis	N	N	Y
Transparent Sensitive Data Protection	N	N	Y
Development Platform			

Feature/Option	SE1	SE	EE
SQLJ	Y	Y	Y
Oracle Developer Tools for Visual Studio .NET	Y	Y	Y
Microsoft Distributed Transaction Coordinator support	Y	Y	Y
Active Directory integration	Y	Y	Y
Native .NET Data Provider—ODP.NET	Y	Y	Y
.NET Stored Procedures	Y	Y	Y
Manageability			
Oracle Change Management Pack	N	N	Y
Oracle Configuration Management Pack	N	N	Y
Oracle Diagnostics Pack	N	N	Y
Oracle Tuning Pack	N	N	Y
Oracle Provisioning and Patch Automation Pack	N	N	Y
Oracle Real Application Testing	N	N	Y
Database Resource Manager	N	N	Y
Instance Caging	N	N	Y
SQL Plan Management	N	N	Y
VLDB, Data Warehousing, Business Intelligence			
Oracle Partitioning	N	N	Y
Oracle OLAP	N	N	Y
Oracle Advanced Analytics	N	N	Y
Oracle Advanced Compression	N	N	Y
Hybrid Columnar Compression	N	N	Y
Heat Map	N	N	Y
Automatic Data Optimization	N	N	Y
Basic Table Compression	N	N	Y
Deferred Segment Creation	N	N	Y
Bitmapped index, bitmapped join index, and bitmap plan conversions	N	N	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

Feature/Option	SE1	SE	EE
In-memory Parallel Execution	N	N	Y
Parallel Statement Queuing	N	N	Y
Parallel capture and apply via XStream	N	N	Y
Transportable tablespaces, including cross-platform	N	N	Y
Summary management—Materialized View Query Rewrite	N	N	Y
Integration			
Basic Replication	Y	Y	Y
Advanced Replication	N	N	Y
Oracle Streams	Y	Y	Y
Database Gateways	Y	Y	Y
Messaging Gateway	N	N	Y
Networking			
Oracle Connection Manager	N	N	Y
Infiniband Support	N	N	Y
Network Compression	N	N	Y
Network Encryption (SSL/TLS)	Y	Y	Y
Spatial and Graph Data			
Oracle Spatial and Graph	N	N	Y
Graph and Semantic Technologies (RDF/OWL)	N	N	Y
Parallel spatial index builds	N	N	Y
Multimaster replication of SDO_GEOMETRY objects	N	N	Y
Partitioned spatial indexes	N	N	Y

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Oracle is committed to developing practices and products that help protect the environment

Hardware and Software, Engineered to Work Together