

Oracle8[™] Release 3 New Features Summary

Features Overview August 2000

This document covers new features introduced in Oracle8i Release 3. For an overview of all new features introduced in the initial release of Oracle8i and in Oracle8i Release 2, see the “Oracle8i New Features Summary” and the “Oracle8i Release 2 New Feature Summary”.

INTRODUCTION

Oracle8i Release 3 (version 8.1.7) is the latest and the ‘terminal’ release of the Oracle8i (version 8.1) database product. Being the “terminal” release ensures that this release is an extremely stable and thoroughly tested release and will be supported longer than the initial versions of Oracle8i. The enhancements and new features in Oracle8i Release 3 are in the following areas:

- Java Enhancements
- Oracle Internet File System (iFS)
- Enhanced XML Support
- Oracle Integration Server
- Security Enhancements
- Other Enhancements

JAVA ENHANCEMENTS

Oracle8i Release 3 continues Oracle’s commitment to providing the industry’s most scalable and high performance Java platform. Oracle8i JVM (formerly known as Oracle JServer), is Oracle’s Java Virtual Machine in both the database and the new Oracle Internet Application Server (iAS). With its new features and containers, the Oracle8i JVM is a comprehensive enterprise Java platform which

can be used to implement all layers of a typical enterprise Java application: user interface layer (Servlets, JSPs), business logic layer (CORBA Server Objects, Session EJBs, Servlets), business or domain objects (Persistent Java Objects, CORBA Server Objects, Entity EJBs), and data management and access layer (JDBC/SQLJ, Java/PLSQL Stored procedures).

Release 3 also introduces many performance enhancements, including the Oracle8i JVM Accelerator, optimized JDBC drivers, the ability to collocate all components within a single Oracle8i tier, and improved per Session Garbage Collection.

ORACLE HTTP SERVER *POWERED BY APACHE*

The installation of Release 3 includes the new Oracle HTTP Server *Powered by Apache* as the default HTTP listener for serving static HTML and stateless Servlets. The database can now receive direct HTTP calls without the need for an application server. Oracle Enterprise Manager has been enhanced to manage the Apache listener.

In addition to the standard “mods” (modules) provided by Apache, Oracle HTTP Server includes Oracle-specific “mods” fully developed and supported by Oracle. Oracle provides these extension modules to Apache:

- *mod_ose*, which allows the routing of requests for stateful, rich, coarse-grained and dynamic contents to the Oracle Servlet Engine while delegating the production of stateless, fine-grained dynamic content to Apache
- *mod_plsql*, which dispatches HTTP requests for stateless PL/SQL and Java stored procedures

ORACLE8i JVM ACCELERATOR

Release 3 now includes the Oracle8i JVM Accelerator, which allows a deployed Java bytecode (.jar or .class) to be translated, compiled, and run as native C compiled code. By using the Accelerator, the performance of Java running in the Oracle8i JVM is dramatically improved, due to the inherent performance benefits of compiled C versus interpreted Java bytecode .

Platform independent Java bytecodes are input to the JVM Accelerator, which then generates platform independent C code. This C code is then compiled using platform-specific compilers

(optimized for their respective platforms), yielding fully optimized platform dependent Oracle8i JVM-specific native shared libraries.

ORACLE SERVLET ENGINE

Servlets are server-side Java classes that execute independently or call back-end components (EJBs, CORBA Server Objects, Java/PLSQL Stored Procedures, other Servlets) and generate dynamic HTML, typically used as a User Interface controller or an Application controller. The Oracle Servlet Engine is a component of the Java2 Enterprise Edition 'stack' within Oracle8i Release 3, as well as within Oracle Internet Application Server (iAS).

The Oracle Servlet Engine is Servlet 2.2 compliant and supports stateful Servlets where each Web client gets a database session. The first request creates a session for the Client and further requests are routed to the same session, where sessions are tracked with cookies or URL-rewrites. The Oracle Servlet Engine scales like other Oracle8i JVM applications and can log valuable Web information in tables for analysis. All Servlets activated by one client are in the same database session providing improved performance and better scalability. Servlets share sessions with EJBs, CORBA Server Objects, Java Stored Procedures, and the default Server side JDBC connection. This provides all the benefits of collocated Web and Java components (low latency, fast response time and higher throughput) and the ability to produce stateful, rich, coarse-grained and dynamic Web content. The Oracle Servlet Engine can be used directly by any HTTP client or through Oracle's extension to Apache (mod_ose), which off-loads the service of stateless and fine-grained dynamic contents to Apache.

ORACLE JAVASERVER PAGES ENGINE

JavaServer Pages (JSPs) are used to dynamically generate actual User Interface or web pages by assembling coarse-grained dynamic content from Servlets (HTML), and back-end components (EJBs, CORBA Server Objects, Java/PLSQL Stored Procedures) and fine-grained content from Java Scriptlets or Static HTML. The Oracle JSP Engine (JSP 1.1 compliant) is integrated with Oracle8i Release 3, Oracle Internet Application Server (iAS), and all web-enabled Oracle products (Oracle HTTP Server, Oracle Portal, Portal-to-go, and JDeveloper). The Oracle JSP Engine supports SQLJ

within JSP Scriplets, data access beans for connecting and querying an Oracle database, custom tags handlers, and the ability to format results of a JSP using XSL.

ENTERPRISE JAVA BEANS 1.1 SUPPORT

Release 3 fully complies with the Enterprise Java Beans (EJB) 1.1 specification, which mandates the support of Entity EJB (bean-managed and container-managed persistency) and XML deployment descriptors (both standard and provider specific) . This allows the assembly and deployment of coarse-grained business entities and business processes without requiring programming infrastructure services (transaction, security, persistence), which typically account for 50-70% of “applications code”.

Bean persistency can be achieved by direct invocation of persistence storage APIs typically SQLJ, JDBC and Java/PLSQL stored procedures (Bean-Managed Persistence) or in a transparent and declarative way (Container-Managed Persistence)

For Container-Managed Persistence EJB, Oracle has defined a Persistence Service Interface (PSI) to handle the relationship between the EJB container and the Persistence Manager. Release 3 ships with a reference implementation of PSI (PSI-RI) which is a simple Persistence Manager providing attribute to column mapping. By providing a common way for dealing with persistence managers, PSI allows their replacement with limited deployment impact.

JAVA TRANSACTION API (JTA) SUPPORT

Release 3 implements the Java Transaction API (JTA) standard, which specifies server-side and client-side transactions demarcation, two-phase commit coordination. Oracle’s JTA implementation supports JDBC, HTTP and IIOP clients as well as JDBC, CORBA/EJB transaction managers and multi-tier transaction context propagation; it also provides optimization for single-phase commit

ENHANCED SUPPORT OF JDBC AND SQLJ

In addition to numerous performance improvements for objects and the server-side JDBC driver, the Release 3 JDBC drivers have complete production support for JDBC 2.0. Release 3 adds support for the XA Resource API, support for PL/SQL table of scalars, support for basic statement

caching which minimizes cursor creation /tear down overhead, support for "Long" API for LOBs manipulation and JDBC/SQLJ support for VARCHAR functions on CLOBs.

Release 3 enhances Oracle's support of the SQLJ standard by fully supporting all the features of JDBC 2.0 as outlined in the forthcoming ISO standard, including support of structured types, scrollable iterators, datasource support, batching, row pre-fetching, and interoperability with JDBC 2.0 connection pooling. SQLJ in Release 3 now provides three different runtime versions, each optimized for different deployment scenarios: A generic runtimes that can be used with any Oracle JDBC driver; a runtime optimized for use with the Release 3 drivers in a JDK 1.1 environment; and a runtime optimized for Release 3 drivers in a JDK 1.2 environment.

Release 3 SQLJ provides a highly productive and unified programming model across different JDBC drivers and JDK environments.

MEMORY PROFILING UTILITY

MemStat is a utility to analyze the different types of memory used by Java classes in a user session.

The Oracle8i JVM uses three kind of memory:

- *call memory*, which exists for the duration of a call (including its recursion)
- *session memory*, which exists for the duration of the session (a connection, state and execution context)
- *permanent or global memory*, which persists as long as the Oracle8i JVM instance is running

MemStat profiles memory usage and produces an HTML report that can be used to locate and eliminate unnecessary static data in Java classes and reduce the memory footprint of Java programs. Java developers, as well as DBAs and site administrators, will find MemStat very useful for developing and deploying Web and Java components.

RICH MEDIA CLASSES

Oracle interMedia Java Classes enable Java applications on any tier (client, application server or database server) to manipulate and modify audio, image, and video data stored in Oracle8i. Release 3 makes it possible for JDBC result sets to include both traditional relational data and interMedia

media objects (images, audio, video). This support enables applications to easily select and operate on a result set that contains sets of interMedia columns plus other relational data. These classes also enable access to object attributes and invocation of object methods.

ORACLE INTERNET FILE SYSTEM (iFS)

Oracle Internet File System (iFS) is a revolutionary extension to the Oracle8i database. Oracle iFS provides the best of both the relational database and file system worlds. Not only does it provide the reliability, availability, and scalability of Oracle8i, it also provides the familiarity and ease of use of a standard file system.

From the end user's standpoint, iFS appears as if it were just another volume on the network. Whether the user accesses the contents of iFS through Windows Explorer, a Web browser, an FTP client, or an e-mail client, the files appear the same. Relational data can appear as files; so too can hybrid documents that combine relational and non-relational data. It also supports intelligent text searches and queries of files and data stored in iFS.

From a developer's standpoint, Oracle iFS is the single data store containing the data for many different applications. And for the system administrator, Oracle iFS provides a single system for file storage and messaging, rather than several separate systems to maintain and administer. In short, Oracle iFS is a simpler way of storing different types of files in the database.

iFS expands the database platform to present documents and media as files and folders that users can access through familiar interfaces such as Windows, the Web (HTTP), e-mail, and FTP. For the first time, companies can ensure valuable content is secure and searchable from a central location. Customers can also use iFS to customize a file server for specific application purposes. iFS includes an XML and a Java-based Developer's Kit that simplifies development and facilitates strong data integration. For example, you could use the iFS Developer's Kit to make the contents of files available to a specific reporting tool or automatically send an email alert to an editor when a file is updated by another user.

iFS is bundled with the database CD pack and is available for free to any customer with a database license.

ENHANCED XML SUPPORT

XML as an enabling technology for Internet application development has been significantly expanded in Release 3, with new capabilities for the easy storage and retrieval of XML.

XML SQL UTILITY (XSU)

The XML SQL Utility (XSU) can generate XML from the results of SQL and JDBC queries. The XML output can be produced as text, or as 'trees' of objects conforming to the popular DOM standard. The XML SQL Utility can also produce the associated DOM, DTD, or ResultSet object of a query.

The XML SQL Utility can also be used to insert, update, and delete XML data in database tables, making Release 3 an efficient XML store for data-driven XML applications. The XML SQL Utility preserves the structure of XML documents when it is saved to the database.

XML DEVELOPMENT KITS

In addition to storage and retrieval, the XML Development Kits for Java, Java Beans, C, C++ and PL/SQL have been integrated into the server's development platform. Included in these XDK's are production components for incorporating W3C standard XML support into applications. Components include:

- *XML Parsers* - enabling programmatic access to XML documents supporting W3C DOM 1.0 and SAX 1.0 standards.
- *XSL Processors* - transforming any XML document to another or other text-based format such as HTML conforming with the W3C XSLT and XPath 1.0 standards.
- *XML Class Generators* - generating class files for the creation of XML documents from DTDs for use in applications, applets, and JavaServer Pages.
- *XML Java Beans* - adding visual and non-visual XML functionality including viewing, parsing and transforming XML documents.
- *XSQL Servlets* - producing dynamic XML or HTML documents from SQL queries over the Internet with support for SQL operations and action handlers, utilizing the underlying XML parser, XSU, and the XSL processor.

All of the above XML components have full globalization support across a wide range of character set encodings, including UTF-8, UTF-16, UCS, US-ASCII, ISO-8859-1 to -9, and others.

XML SUPPORT IN iFS

Building upon the XML foundation support detailed above is the Oracle Internet File System (iFS). XML documents are natively supported in iFS storing them in two ways: 1) stored in relational schema (and potentially as object-views) where it may be accessed and updated as regular data and 2) the original tagged document may also be stored in a CLOB, for performance and security reasons. iFS provides a Java interface for application development and includes support for a variety of protocols including SMB, FTP, HTTP, IMAP POP3, and SMTP.

ORACLE INTEGRATION SERVER

Oracle8i Release 3 introduces Oracle Integration Server, an integrated suite of Internet standard components used to simplify the integration of data, applications, and inter-business processes. Oracle Integration Server (OIS), based on Oracle database and application products, allows sites to easily install and configure a highly scalable and standards-based integration solution.

Data Integration. Disparate applications work with different data sources and/or databases. In order to maintain consistency across various sources, the data needs to be synchronized. Using OIS, Internet based applications can transparently access, manage, and operate on data stored in different formats. Oracle8i functionality such as replication, transparent gateways, and distributed queries and transactions provide the foundation for meeting demanding data integration requirements.

Application to Application Integration. To facilitate synchronous communication between applications, request-reply protocol based functional interfaces are necessary whereas asynchronous communication requires message-based technology. OIS supports both form of communications and provides standard functionality to model business process flows. Oracle8i Advanced Queuing provides the foundation for the messaging requirements, while Oracle Message Broker and Oracle Workflow simplify the management and operation of application message configuration.

Business-to-Business Integration. Business-to-Business integration requires messaging facilities that provide guaranteed, exactly-once, in order delivery of messages; stringent security including the

ability to audit and track messages; and support for Internet standards such as XML messaging over HTTP(S). OIS meets these requirements and provides a secure, reliable and scalable infrastructure through Internet standard components to enable collaborative transactions with supply-chain partners and Net Marketplaces.

Oracle Integration Server (OIS) is an installation option when installing Oracle8i Release 3. Sites must be licensed for all components of OIS that they use. OIS is not a separately licensed product.

SECURITY

Oracle8i Release 3 introduces several new features and support for the latest security standards to provide the most comprehensive and robust security architecture in the industry

Oracle Advanced Security now supports Triple DES (Data Encryption Standard) as well as longer encryption keys for RC4 (256-bit), providing more secure and robust network security.

For applications with special requirements to secure sensitive data from view, even from DBAs, Oracle8i Release 2 introduced a PL/SQL package to encrypt and decrypt data, including string inputs and raw inputs, using the industry-standard Data Encryption Standard (DES). This functionality allows data to be natively encrypted in the server to protect especially sensitive data, such as credit card numbers, “application user” passwords, or session cookies. Release 3 now enhances this capability by supporting the Triple DES algorithm in this feature.

Release 3 supports integration with the Entrust PKI for authentication and single sign-on through the Oracle Advanced Security option. Customers who have made a commitment to Entrust can now easily integrate their Oracle-based applications with the Entrust authentication and encryption framework. In addition, Oracle Internet Directory now works with the Entrust PKI to serve as a repository for publication of information such as certificates and certificate revocation lists. With Oracle Advanced Security, Oracle8i is “Entrust-enabled”.

Other Release 3 security enhancements include SSL encryption of HTTP connections and strong encryption for thin JDBC connections

OTHER ENHANCEMENTS

Oracle8i Release 3 introduces the PL/SQL Gateway, which provides native, out-of-the-box support in the Oracle server for deploying PL/SQL based database applications on the web. The PL/SQL Gateway allows PL/SQL developers to write PL/SQL stored procedures that generate HTML, which is of particular use when deploying PL/SQL Server Pages, first introduced in Oracle8i Release 2. PL/SQL Server Pages, which are similar in concept to JavaServer Pages, allows PL/SQL to be embedded in HTML documents to produce web pages with dynamic content.

Oracle Enterprise Manager includes several enhancements in Release 3:

- Object DDL can now be viewed and DDL actions can now be logged.
- New HTML reporting functionality includes database performance, configuration and status reports, as well as enterprise level reports for the Oracle Enterprise Manager repository data.
- Enhanced Replication Management functionality, including full integration into DBA Studio.
- Resource Management Wizard is now available to assist in configuring and managing the Database Resource Manager.
- Customization of the content and formatting of enhanced notifications (paging and email) is now supported.
- The Paging Server can be configured from the Enterprise Manager Console.
- Discovery and monitoring of Apache web servers is now supported.

Managing a Standby Database has been enhanced in several ways:

- The DUPLICATE command can now be used to create a Standby Database.
- Recovery Manager (RMAN) backup and recovery on a Standby Database is supported.
- A Standby control file can be created within RMAN.
- A complete Standby can be created without first creating a RMAN backup.

interMedia has been enhanced in several areas:

- interMedia has been enhanced to support image, audio, and video export from the database to a file

- A new index type for interMedia Text is available for optimized “dot com” catalog searches and queries
- interMedia Text has fuzzy-weight pass-through where documents are scored by nearness of match rather than all fuzzy matches identical
- interMedia Text has enhanced globalization support: Multi-language lexer can use a different stoplist for each language; User knowledge-base can be created in any eight-bit-ascii language; Limited content-based routing in non-theme-supported languages.
- Users can choose which tokens to optimize in interMedia Text to improve performance.
- General usability has been improved in interMedia Text: Multi-column index support; Requirement for a primary-key column dropped; Translation additions to the thesaurus made easier.

Oracle8i Release 3 includes many improvements to many areas of the Oracle server:

- Replication no longer requires a quiesce to create a single master site or add objects to a single master group.
- Oracle Internet Directory has been enhanced to support the use of different algorithms for encrypting directory passwords.
- Unicode 3.0 is supported in the Oracle character sets UTF8 and UTFE. It is synchronized with ISO/IEC 10646-1 second edition, and includes an additional 10,307 code points..
- The new Hong Kong government character set coding standard (HKSCS) is now supported.
- A new utility, the Database Character Set Migration Utility, reports on the feasibility of migrating to a new database character set. It scans the data in the database (data dictionary and application data) and provides an analysis of the current data, highlighting data which will be replaced during the migration.
- Users can now view Traditional Chinese data on Traditional Chinese clients and Simplified Chinese data on Simplified Chinese clients regardless of the type of Chinese data (Traditional or Simplified) being stored in the database.
- Oracle Spatial has been enhanced to better support linear referencing, R*tree indexing, coordinate systems, geoinage management, and database workspace management.
- Oracle Objects for OLE has been improved to include full support of Unicode (UTF8), a new Code Wizard for Store Procedures to speed development time, and execution of SQL and PL/SQL statements in non-blocking (asynchronous) modes.

FEATURE AND OPTION AVAILABILITY

Oracle offers three products in the Oracle8*i* product line: Oracle8*i*, Oracle8*i* Enterprise Edition, and Oracle8*i* Personal Edition. Oracle8*i* Personal Edition includes all features and options available with Oracle8*i* Enterprise Edition, except Oracle Parallel Server.

This document describes all new features and functionality found in Oracle8*i* Release 3. For details on what features are available with each edition of Oracle8*i*, consult the white paper “Oracle8*i*: A Family of Database Products” at www.oracle.com/database/availability.

ORACLE8i/RELEASE 3 NEW FEATURE SUMMARY

JAVA ENHANCEMENTS

- Oracle HTTP Server Powered by Apache
- Oracle8i JVM Accelerator
- Oracle JavaServer Pages Engine (JSP 1.1)
- Oracle Servlet Engine (Servlet 2.2)
- Enterprise Java Beans (EJB 1.1, Entity EJB)
- Persistence Service Interface (PSI) for Container Managed Persistence EJB
- Java Transaction API (JTA)
- Comprehensive JDBC (2.0)
- SQLJ ISO standard
- JDBC support for "Long" API over "LOBs"
- JDBC/SQLJ support for Varchar functions on "CLOBs"
- Memory profiling utility

ORACLE INTERNET FILE SYSTEM

ENHANCED XML SUPPORT

- XML SQL Utility

- XML Development Kits (XDKs)

ORACLE INTEGRATION SERVER

SECURITY

- RC4 256-bit and Triple DES supported in Oracle Advanced Security
- Entrust PKI integration
- SSL encryption of HTTP connections
- Strong encryption of thin JDBC connections

OTHER ENHANCEMENTS

- PL/SQL Gateway
- Oracle Enterprise Manager enhancements
- Improved management of Standby Databases
- Various Unicode and character set enhancements
- Various interMedia enhancements
- Oracle Spatial enhancements
- Various Oracle Objects for OLE improvements

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