



A Family of Products with Oracle8™

An Oracle Technical White Paper

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INTRODUCTION

Network Computing Architecture[™] (NCA) provides a cross-platform, standards-based environment for developing and deploying network-centric applications. NCA recognizes the increasing importance of web servers, database servers, and application servers working together to enhance communication and deliver a wide array of information on demand to the desktop.

The real business challenge is to seamlessly integrate existing systems with new web and object technologies, creating operational, decision support, intranet, and electronic commerce solutions that are needed to run a business. To address these challenges, all Oracle products are embracing NCA, from the core Oracle8 database to Oracle's comprehensive development tools and packaged enterprise applications.

A key strength of Oracle's product offering is the breadth of tools available for working with the Oracle database. Database application development requires tools to build, design, and manage the applications. In addition, Oracle is working with many third-party partners to ensure that their products fully leverage and exploit the new capabilities provided with Oracle8.

Additionally, all products and applications running against an Oracle8 server take full advantage of the on-line transaction processing (OLTP) and very large database (VLDB) enhancements inherent in the server product. Performance gains through the use of partitioned tables, parallel data manipulation (DML) and query, and parallel index scans are instantly reflected within a user's application.

Oracle offers a complete set of tools that make it as easy to build and deploy applications for a potentially large network of computers as it is to build applications for a single computer. Developers can focus on solving business problems instead of on programming application infrastructure. Oracle products provide users with the easiest way to build and deploy robust scalable applications for business and the Internet. The suite of products make it possible to:

- Provide an easy-to-use and robust management system for all servers in the enterprise.
- Make application development simpler with component creation and assembly tools.
- Enable mining of data from data warehouses with powerful on-line analytical processing (OLAP) and decision support tools.
- Deploy web applications as easily and reliably as client/server applications.
- Use robust off-the-shelf industry applications with the world's premier database.

Following is a more detailed description of the capabilities of some of the robust set of products and tools provided by Oracle to aid in the management and development of complex computer systems and applications. All of these products are integrated with the Oracle8 system. This paper focuses on how these specific products take advantage of the new features of Oracle8. The specific features of the Oracle8 system itself are discussed in other white papers.

SQL*PLUS®

SQL*Plus, the primary ad-hoc access tool to the Oracle8 server, provides a powerful yet easy-to-use environment for querying, defining, and controlling data. Along with a rich set of extensions, SQL*Plus delivers a full implementation of Oracle SQL and PL/SQL™.

SQL*Plus provides a flexible interface to Oracle8, enabling developers to manipulate Oracle SQL commands and PL/SQL blocks. With SQL*Plus, you can easily create ad hoc queries, retrieve and format data, and manage the database. For maximum administrative flexibility, you can work directly with Oracle8 to perform a variety of database maintenance tasks. You can view or manipulate database objects, even copy data between databases.

SQL*Plus provides:

- Powerful data retrieval
- Rich custom formatting
- Dynamic SQL-based queries
- Complete session control
- The power of procedural logic and full integration with PL/SQL
- Powerful error handling

The new Oracle8 features can be implemented through SQL*Plus 8.0.3 for maximum flexibility and ease of use. New Oracle8 features, such as creating and maintaining partitioned objects, using parallel Data DML commands, creating index organized tables and reverse key indexes, deferred constraint checking and enhanced character set support for National Language Support can be implemented with SQL*Plus. SQL*Plus also supports the new password management capability of Oracle8.

In addition, SQL*Plus 8.0.3 fully supports the object capability of Oracle8, as well as its very large database support features. New object types can be defined, including collection types and reference (REF) attributes. SQL*Plus supports the SQL syntax for creating object tables using the newly defined object types, as well as all the new DML syntax to access the object tables. Object type methods are written in PL/SQL from the SQL*Plus tool, along with object views and INSTEAD OF triggers. All the storage handling syntax is supported from SQL*Plus, in addition to handling all aspects of Large Object (LOB) manipulation and storage management.

ORACLE8 ENTERPRISE MANAGER

Oracle8 Enterprise Manager is Oracle's framework for managing the Oracle environment. Enterprise Manager consists of a centralized console, common services, such as job scheduling and event management, and intelligent agents running on managed nodes. Various applications run on this framework performing comprehensive systems management capabilities.

Oracle8 Enterprise Manager 1.4 supports the new scalability features of Oracle8 such as partitioning, queuing, password management, and server managed backup and recovery. Bundled with the Console are a set of database administration tools that help automate and simplify the common tasks in the life of a database administrator (DBA). All the tools provide an intuitive graphical user interface, with drag-and-drop functionality, wizards, and a common look-and-feel which minimizes training costs. Simple, easy-to-use features are provided. This allows DBAs to specify what they want to do, rather than how it needs to be done.

Time is critical in a recovery situation, where every minute of down time can be very expensive. Oracle8 Enterprise Manager improves the availability of the data in a recovery situation by enabling the DBA to complete recovery sooner. Oracle8 Enterprise Manager Backup Manager provides a graphical interface to various backup options, such as the new Oracle8 utility, Recovery Manager. The Oracle8 Recovery Manager supports secure management of backups by using either a recovery catalog or a control file. The DBA initiates restore and recovery operations very quickly, using a point-and-click interface, allowing the recovery operation to complete that much sooner. In addition, backups can be created quickly and easily with Oracle8 Enterprise Manager Backup Manager. Those backups can be scheduled to run at off-hours of the day using Oracle8 Enterprise Manager job scheduling capability. In addition, Oracle8 Backup Manager also has support for Oracle7™ type database backups.

Oracle8's password and user management can also be handled from Oracle8 Enterprise Manager for maximum flexibility and ease of administration. Oracle8 Enterprise Manager provides graphical user interface (GUI) support for all the password management capabilities of Oracle8. Additionally, Oracle8 Enterprise Manager supports GUI creation of global users and global roles, greatly simplifying the security administrator's user management tasks. Along with deferred constraint checking and enhanced character set support, a future release of Oracle8 Enterprise Manager will provide object support and transparent application fail-over in an Oracle® Parallel Server environment.

DESIGNER/2000™: MODEL ONCE FOR MULTIPLE TARGETS

Designer/2000 is a business and application modeling tool with the unique ability to generate complete applications from those models. Business analysts and developers use a visual modeling interface to represent and define business objects, functionality, business rules and requirements in a very simple, declarative way. These rules can then be implemented on one or more tier: on the client, application server or database server.

Designer/2000 enables the definition of systems independently of their implementation so that applications can be generated in multiple environments and configurations from a single model. Developers can reuse these definitions by simply dragging and dropping them into new models. From these models, Designer/2000 generates and reverse engineers Oracle database objects, Developer/2000 client/server and web applications, Oracle® Web Application Server applications, Visual Basic applications, Oracle Power Objects® applications, and C++ mappings for database objects.

Designer/2000 2.0 also provides modeling, generation, and design recovery for all the scalability features of Oracle8, such as partitioned tables, new LOBs, index organized tables and deferred constraint checking, as well as object features including user defined types, type tables, referenced and embedded types, and object views of relational data. These concepts are represented using an extension of the unified modeling language (UML), the emerging open standard for object modeling. The design is then implemented within the Oracle8 Server through automated SQL DDL generation. Existing Oracle8 Server designs can be reverse engineered into the Designer/2000 Release 2.0 repository, including the automated construction of diagrams based on recovered objects and definitions.

Additionally, in the definition of client-side applications, Designer/2000 uses a concept called a 'module component'. A module component defines what data is accessed (tables and columns), how it appears in a form, and what specialized behavior it has (in addition to that inherited from the tables it includes, e.g. validation rules). A module component can then be included in many forms, reports, etc. Any change made in the original component definition will be inherited in every module definition that includes the component.

OBJECT DATABASE DESIGNER

Object Database Designer is the natural companion for anyone designing and building Oracle8 systems. The product addresses key areas of functionality designed to aid in all aspects of ORDBMS design, creation, and access: type modeling forms the core of an object oriented development, and is used in all stages of analysis and design. Object Database Designer, like Designer/2000, implements type modeling by UML; thereby meeting the needs of both the major developer roles: database designers and application developers.

The type model is transformed into an Oracle8 database schema, giving the database designer an excellent head start on the design, and mapping abstract type models onto the world of ORDBMS. The designer can then refine this schema design to exploit Oracle8 implementation options. Then the visual design is automatically translated into the appropriate SQL DDL to implement it. This approach takes the effort out of manually building a database, and guarantees bug-free SQL.

Because it is equally important to be able to visualize existing database structures, Object Database Designer supports reverse engineering and full round-trip engineering of model and schema. This database design and generation capability is identical to the corresponding capability in Designer/2000 thus providing DBAs with a single tool-set. However, Object Database Designer is specifically designed for developers of Object Oriented 3GL applications of Oracle8.

C++ is currently the most widely used object-oriented programming language, as such it is extremely important to provide a mechanism for C++ programs to seamlessly access Oracle8. Using the type model as its base, the C++ generator automatically generates C++ classes that provide transparent database persistency for those objects. This delivers major productivity benefits to C++ programmers, allowing them to concentrate on application functionality rather than database access.

C++ Generator also creates a run-time mapping to allow those applications to interact with their persistent store: the Oracle database. This allows the database schema to migrate without unnecessarily affecting the applications. Additionally, by exploiting the power and performance of the Oracle8 client-side cache, the generated code provides a high performance database access. Not only is the interface simplified for the developer, it is also performance tuned.

On the client side, Object Database Designer generates a library of class definitions, each of which may have a persistency mapping onto Oracle8 types. The class structure generated is based on the abstract type model, which is UML compliant and hence is capable of modeling and generating multiple inheritance class structures. However, the transformer to Oracle8 schema design only resolves single inheritance trees, which it implements using a number of options (super-type references sub-type, sub-type references super-type, super-type and sub-type union, and single type with type differentiator attribute).

The type modeling and generation in Object Database Designer is a streamlined packaging of the equivalent Designer/2000 capability. Object Database Designer is focused specifically at the Oracle8 database designer and C++ Programmer.

DEVELOPER/2000™: BUILDING ENTERPRISE DATABASE APPLICATIONS

Developer/2000 is a high-productivity client/server and web development tool for building scalable database applications. A typical Developer/2000 application might include integrated forms, reports, and charts, all developed using an intuitive GUI interface and a common programming language, PL/SQL. Developer/2000 applications can be constructed and deployed in two-tier or multi-tier architectures, in a client/server or web environment.

One of the strengths of Developer/2000 lies in its database integration and its inherent ability to support highly complex transactions and large numbers of users. Oracle has carried these strengths through to the Developer/2000 Server, an application server tier that supports the deployment of robust database applications in a network computing environment. The Developer/2000 Server enables any new or previously-created Developer/2000 application to be deployed on the Web using Java, and to publish information using such industry standard formats as HTML, PDF, and GIF.

Oracle8 Developer/2000 Release 2.0 is fully certified for application development against Oracle8, leveraging the OLTP and VLDB enhancements in the server. Performance gains through the use of partitioned tables and parallel DML/query are instantly reflected within a user's application. This release will also enhance the large scale OLTP nature of applications developed with Developer/2000 by support of such functions as transparent application fail-over, password management, and connection pooling.

Forthcoming releases of Developer/2000 will include support for Oracle8's object data types and such features as PL/SQL8 (client side), LOBs, object views, nested tables, varrays, and REFs to objects. Furthermore, the Wizard-based development metaphor within Developer/2000 will be enhanced to allow easy interpretation and manipulation of these objects. Along with an enhanced user interface to support these newer more complex data structures, Developer/2000 will allow developers to extend the scalability of their applications and provide greater access to the object world. Traditional relational application developers will be able to incorporate these new data types through a familiar development paradigm.

SUMMARY

Oracle offers a powerful suite of development and management tools that fully support the new Oracle8 functionality. These include:

- *SQL*Plus*: A powerful tool for querying, defining, and controlling data.
- *Oracle8 Enterprise Manager*: For managing and administering a distributed database environment.
- *Designer/2000*: A modeling and application-generation and reverse engineering tool for database applications and cartridges.
- *Object Database Designer*: An object database design, creation, and access tool.
- *Developer/2000*: A RAD tool for client/server and web database applications deployed in Java.

All Oracle products are being upgraded to fully leverage the new features of Oracle8 to maximize usability, functionality, and ease of use. These new features help developers and administrators productively and effectively build, manage, and deploy high performance, robust enterprise applications.



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