Oracle9*i* Application Server:
Oracle Forms Services

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Oracle9*i* Application Server: Oracle Forms

INTRODUCTION

Oracle Forms Developer is in a class by itself, raising the development bar for applications deployed to such industries as Banking and Finance, Stocks and Bonds, Aerospace, Communications, Manufacturing, Retail, Health, Legal, Government, and Education. Key customers and partners in these industries include Lockheed Martin, Retek, LIMITrader, Keystone Solutions, Louisiana Department of Natural Resources, and the Australian Geological Survey Organization. With Oracle Forms, business applications developers quickly build comprehensive database applications that meet (and exceed) the requirements of professional user communities—rich, Web-deployed applications available on demand for rapid processing of large amounts of data and rapid completion of complex calculations, analysis, and transactions.

> *"Among the benefits: better response times to client inquiries and more billable hours on the clock, thanks to faster, more accurate time reporting. Time is now recorded daily on screen rather than weekly on paper. With fee earners entering data directly into the system, many potential errors, including faulty transcribing of matter numbers and descriptions and misplaced timesheets, are eliminated." DJ Freeman uses Keystone Practice Management Solutions http://www.keystone-solutions.com.*

This paper provides a high-level view of the features and benefits available through Oracle Forms Developer and Oracle Forms Services.

PRODUCT OVERVIEW

Oracle Forms Developer

Oracle Forms Developer is a productive RAD development environment for building enterprise-class Internet database applications with compelling, sophisticated Java user interfaces. Applications developers can use the tool to quickly build complex Java applications for viewing, changing, and adding information to a database, without writing any Java code. Forms Developer's integrated set of builders allows business developers to easily and quickly construct sophisticated database forms, charts, and business logic with minimal effort. The development environment provides powerful declarative features, such as wizards, built-ins, and drag-and-drop, for the creation of fully functional

applications from database definitions with minimal coding in record time. Oracle Forms Developer also provides an open, extensible user interface model that allows full customization and extension of applications with Java.

Oracle Forms Services

Oracle Forms Services delivers the application infrastructure and the event model to ensure that your Internet applications automatically scale and perform over any network. It provides an extensible, optimized Java client, high performance over any network, out-of-the-box scalability, and access to XML, Java, and CORBA. Forms Services built-in services include transaction management, record caching, record locking, exception handling, and load balancing, all provided natively as part of the Forms Services engine. Oracle Forms Services built-in services provide a critical infrastructure that you would otherwise have to code and re-code by hand many times over throughout all parts of your application.

Application Framework

Oracle Forms Developer and Oracle Forms Services provide a complete application framework for optimal deployment of Oracle Forms applications on the Internet. Together they deliver a RAD environment and application infrastructure to ensure that your Internet applications automatically scale and perform over any network.

The framework is open and extensible and continually evolving, allowing you to:

- Seamlessly move your applications forward with each new technological wave

- Easily extend your user interface through native Java with Pluggable Java Components

- Leverage technologies such as Java and XML through code-based integration

With Oracle Forms Developer and Forms Services, the application framework infrastructure is provided for you, yet you still have the flexibility to leverage the latest technologies within your applications. This allows you to focus on the real value-add—spend your time thinking about the application business logic and functionality rather than worrying about the application "plumbing."

BUILD RICH JAVA APPLICATIONS WITH ORACLE FORMS DEVELOPER

RAD Development with Oracle Forms Developer

"Developers who need to create and deploy database applications to browser-based clients will find Oracle Developer significantly speeds up productivity." ¾InfoWorld (April 26, 1999) "Oracle Powers Web Applications"

The rapid growth of e-Commerce and the Internet is accelerating expansion of user communities and driving a resulting demand for higher levels of application performance, reliability, and availability. Business environments are more dynamic than ever before, requiring that applications be adapted to changing business requirements in shorter amounts of time. More than ever before, businesses need tools that enable rapid response to changing requirements and rapid and seamless application deployment.

Oracle Forms Developer meets this need. Both novice and expert developers benefit from Oracle Forms Developer's declarative RAD environment. Forms Developer enables business developers to build Java applications that are optimized for the Internet without writing any Java code. The tool set includes many wizards and utilities to speed application development:

- Use the **Data Block Wizard** to easily create or modify data blocks for use in your application. The Data Block Wizard can be reentered after initial creation of the data block, enabling you to modify an existing data block, even if it was not originally created with the wizard.

- Use the **Layout Wizard** to quickly lay out the items of a data block. The wizard displays the items in a frame on a canvas and lays them out in one of several layout styles, which you can manually alter to your own specifications. You can reenter the Layout Wizard after the initial creation of a frame, enabling you to modify an existing frame, even if it was not created with the Layout Wizard.

- The **Property Palette** enables you to set the properties of objects you create in form and menu modules. When you select an object in an editor or in the Object Navigator, the Property Palette updates to show the properties of that object. When you need to compare the properties of two different objects, you can invoke additional Property Palettes as needed.

- The **integrated PL/SQL Editor** enables you to write PL/SQL code from within Form Builder. It provides a graphical interface for editing and debugging applications.

- **Object Libraries** provide an easy method for reusing objects and enforcing standards across the entire development organization.

- Forms Developer provides several **built-in packages** that contain many PL/SQL constructs you can reference while building applications or debugging your application code.

- Oracle Forms Developer and Oracle Forms Services provide the means to deliver applications to your users in their native language. **Support for Unicode** global character set allows multinational corporations to develop a single multilingual application and deploy it to their users worldwide.

Build rich, extensible user interfaces

Forms Developer provides many native widgets and default controls for rapid development of compelling Java UIs with minimal coding. Native widgets and defaults include hierarchical tree controls, tab-pages, check-boxes, pop-up lists, tooltips, summary totals, and calculated fields.

Forms Developer provides an extensible UI through Pluggable Java Components (PJCs). You can easily extend and customize your Java user interface beyond the default functionality by integrating your own custom-built Java components into your Oracle Forms applications. You'll find a number of sample JavaBeans and PJCs shipped with Release 6*i* and available for download from the Oracle Technology Network (http://technet.oracle.com). These include Web roll-over buttons, hyperlinks, and client-side upload functionality.

Build Java extensions with Oracle JDeveloper or your favorite 3GL Java development environment, and seamlessly integrate them into your Oracle Forms application. The Oracle JDeveloper PJC Wizard helps you wrapper your custom Java classes to extend your Oracle Forms applications. This is an excellent example of the integration between JDeveloper and Oracle Forms, and highlights the benefits of the integrated Tools offering from Oracle. You have the benefit of the Oracle Forms Developer RAD environment and the scalability of the Forms Services to ensure performance yet can still gain the benefits of open integration with Java to easily customize and extend your applications.
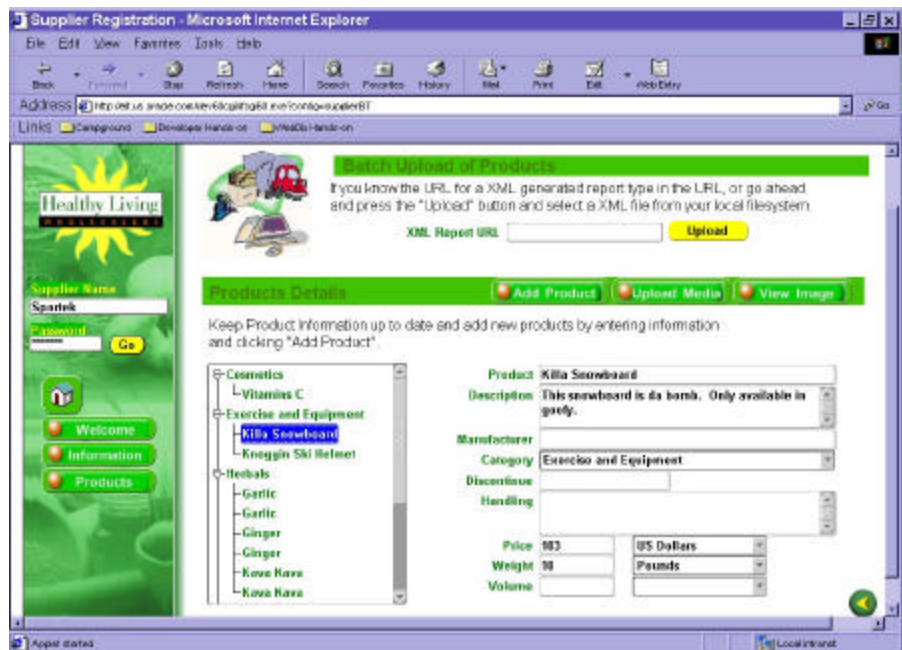
Figure 1 - **The Healthy Living application, built with Oracle Forms Developer 6i, showcases a rich Java UI that uses native features of Forms Developer and leverages Java to extend the UI through Pluggable Java Components.**

Tight Integration with Oracle8*i*

With over 60 percent of the global market share, Oracle is the worldwide leader in database servers across all industries. Oracle8*i* offers superior manageability, high availability, and ease of use. It provides integrated data management for all Internet content within your organization. It is "the" Java deployment platform of choice.

Oracle Forms Developer is specifically designed and optimized to build Oracle8*i* transactional database applications. Oracle Forms Developer is designed for the Oracle8i database. It delivers the following services for you natively—services you would otherwise have to code by hand:

- Connects to and maintains a connection to Oracle8*i*

- Queries and handles a large number of records on demand

- Locks database records on demand

- Generates code that automatically supports multi-user locking scenarios

- Manages inserts, updates, and deletes automatically

- Allows programmatic manipulation of sets of records for a developer

- Communicates transactions efficiently to the database

Use the Data Block Wizard to automatically link your application to tables in your database and easily build a complex Master-Detail Web form with operations automatically synchronized between two or more data sets. Use the form to query, insert, update, and delete data and to immediately preview your changes on the Web.

With this seamless integration between Oracle Forms Developer and Oracle8*i* you can build Internet applications that use Resource Management, Advanced Queuing, Subscription, Distributed Queries, Partitioning, and Parallel Server to more effectively share resources between applications and to improve application performance and scalability. Improve the performance of queries across multiple homogenous and heterogeneous environments through optimized distributed query plans and other replication enhancements. Implement fine-grained, centralized access control and auditing through Oracle8*i* security policy management features.

Integration with Oracle Designer

Oracle Forms Developer's tight integration with Oracle Designer provides the most compelling tool-set available for supporting the full application development life-cycle. The modeling tools in Oracle Designer allow you to visually capture business requirements and transform them into physical designs. The design tools and application generators lead business developers through the process of quickly converting physical specifications into fully functional Oracle Forms Developer

applications. The client generators are fully integrated with Oracle Forms Developer for both forward- and reverse-engineering. You can model what you build and build what you model. Switch smoothly between tools for iterative, rapid development and prototyping.

Extend pre-packaged Oracle Applications

Oracle Corporation is the second largest vendor of pre-packaged applications. Further, the prevalence of packaged applications based specifically on Oracle Forms Developer technology is notable.

With Oracle Forms Developer you can extend and enhance Oracle's pre-packaged applications, tailoring them to the unique needs of your organization. With over 300 partner products worldwide based on Oracle Forms Developer technology, Oracle Forms Developer is a solid bet for protecting and efficiently exploiting your applications investment.

DELIVER SCALABLE INTERNET APPLICATIONS WITH ORACLE FORMS SERVICES

Optimized, generic Java Client

The Forms Services uses a three-tier architecture for application deployment: Data is stored on the database tier; the forms application is executed on the middle tier; and the application display is rendered by the Java client via an end-user's Internet browser.

Java Client   Forms Server   Data Server
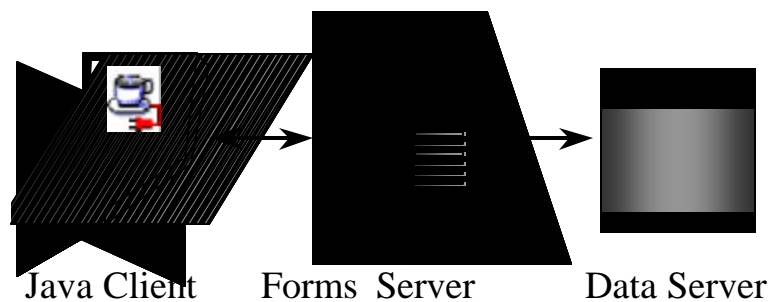
Figure 2: Deploying Forms with Oracle Forms Services

The Forms Java Client is a Java applet downloaded at runtime from the middle-tier to an end-user's Web browser. The Java Client displays the form's user interface and manages interaction between end-users and the Forms Services. It is primarily responsible for rendering the application display, and it has no embedded application logic. Consequently, we call it "generic" and make it

available for reuse with all your Forms applications, without requiring any code customization from one application to another.

With Oracle Forms Services, unlike with other Java solutions, your users do not have to download a separate Java applet for every application or screen they want to run. The applet is downloaded once and runs every application—regardless of its size or complexity. Oracle Applications Release 11*i* is a perfect example of a Forms Services application that uses the same applet to run every component of this very large suite. Far fewer client resources are required when compared to having a Java client for each application.

The Forms Java Client has been optimized for high performance and application start-up over many different network topologies. The Java Client has been finely tuned to allow the efficient display of widgets and the minimization of time and frequency for page refreshes on the client.

Another key element of the optimized Java client is the use of JAR file caching. Oracle Forms Services uses client-side caching to persistently cache the Java applet on the desktop. This means that, after the initial download, the Java applet is automatically cached. Any subsequent access to the application pulls the JAR file directly from the persistent client-side cache, significantly minimizing start-up time. JAR file caching is an essential performance feature for any application with remote users who dial-in to access the application over a wide area network.

The Forms Java Client is certified to run on a growing number of different browsers and platforms, including Oracle JInitiator, Microsoft Internet Explorer on Windows and Apple Macintosh, and the Java Plug-in on Solaris.

High performance over any network

The Forms Services has been optimized for high performance over any network, including LAN, WAN, and dial-up environments or over the Internet with HTTP/1.1 support:

The Forms Services **minimizes network traffic** through its unique meta-data driven architecture. The Forms Services communicates to the Java Client through a unique messaging protocol that uses meta-data messages, a collection of name-value pairs, to tell the Java Client which object to act upon and how. This generates approximately 90 percent less traffic than other solutions that do not utilize this meta-data model—solutions that do not employ this model must send new code across the network to achieve the same effect, increasing the number of network roundtrips and significantly slowing performance.

In addition, Forms Services minimizes network traffic by intelligently condensing the data stream in a number of ways:

- "Message diffing" ensures that when sets of similar messages (collections of name-value pairs) are sent, the second and subsequent messages include

only the differences from the previous message. This results in significant reductions in network traffic.

- When the same string is to be repeated on the client display (for example, when displaying multiple rows of data with the same company name), Oracle Forms Services sends the string only once, and then references the string in subsequent messages. Passing strings by reference increases bandwidth efficiency.

- Data types are transmitted in the lowest number of bytes required for their value.

- Event Bundling "gathers" all of the events triggered while navigating between the two objects, and delivers them as a single packet to the Oracle Forms Services for processing.

Oracle Forms Services Release 6*i* introduces **Internet support with HTTP/1.1 and SSL**. Forms Services provides three modes for Web deployment:

- sockets
- HTTP
- HTTPS

Sockets

A socket is a standard programming interface to TCP/IP. The socket mode of deployment is efficient and simple to use. The Forms Services runs on a networked host machine and listens on a specified socket or port for connections from the client running on a user machine. For this method to work, the client and server machines must be able to communicate with one another directly on the network. Consequently, it isn't possible to use a server-side proxy (necessary for use with a firewall and other security measures) in sockets mode.

HTTP

With HTTP, communication is also accomplished through a "socket connection," but it is now an HTTP socket connection. The Forms Services listens for HTTP connections from a Java Client rather than for proprietary connections via specified sockets. All internal messaging between the Forms Services and the Java Client is encapsulated in HTTP packets. An HTTP socket connection makes it possible for sites to allow secure communication between clients and servers through a firewall.

HTTPS

HTTPS is an HTTP connection with the addition of a Secure Socket Layer (SSL) protocol. This provides server authentication, secure data transmission, and data

integrity. To enable an HTTPS connection, you must obtain a certificate from a Certification Authority (CA) and store this certificate on the server side using Oracle Wallet Manager (installed with Forms Services). Using HTTPS, you can deploy Forms applications on the Internet securely with 128-bit encryption for domestic versions and 40-bit encryption for export versions.

Out-of-the box scalability

Forms Services is optimized to deploy Oracle Forms applications in a multi-tiered environment. It delivers the application infrastructure and the event model to ensure that Internet-based Forms applications automatically scale and perform over any network. Oracle Forms Services is optimized to reduce network traffic for Internet, intranet, and extranet deployments.

Oracle Forms Services load management enables system administrators to dynamically balance server load across multiple machines and allocate resources based on a configurable least-loaded-host algorithm. Load management supports a distributed environment, with no single point of failure, and promotes the most efficient use of hardware and system resources.

Oracle Forms Services uses memory mapping to reduce each user's total memory footprint. When multiple users access the same .fmx file, the read-only portions of that file are shared across processes. Shared elements include encoded program units, boilerplate objects, and images.

Application configuration and management is one of the hidden costs associated with the delivery of enterprise-wide applications. Oracle Enterprise Manager is integrated with Oracle Forms Services to enable you to start-up and shutdown Forms Services; monitor Forms Services and Load Balancer Servers used in load balancing configurations; and monitor user processes, memory, and CPU utilization.

Open access to Internet Standards—leveraging Java and Xml

Through code-based integration, Oracle Forms Services gives you the flexibility to leverage emerging standards, including Java and XML, within your Oracle Forms applications. This gives you the best of both worlds: the application framework and built-in scalability and performance of the Forms Services along with the flexibility to leverage Java and XML to extend your applications.

Through Pluggable Java Components you can use Java to extend your application UI, and through code-based integration you can access Java Stored Procedures in the Oracle8*i* database, as well as Enterprise JavaBeans and XML. A number of code samples and utilities are available from Oracle Technology Network (http://technet.oracle.com). These include a form that demonstrates access to a

Java Stored Procedure, a Forms to Java Bridge, and a utility that generates PL/SQL call specs for a specified Java program.

PROTECT YOUR INVESTMENT

Whenever a new software technology is introduced, early adopters often sacrifice the benefits of mature, productive, and powerful development tools in the rush to exploit and deploy the latest thing. Does this mean that cutting-edge businesses must choose between the latest technology and the best tools?

No.

By choosing the right development tools from the right tool vendor, businesses can significantly reduce the technology learning curve, dramatically increase productivity, and actually shorten the time to market while producing higher quality, more reliable, more scalable applications that effectively exploit the benefits inherent in new technology.

By *the right tools*, we mean, among others, Oracle Forms Developer and Oracle Forms Services.

Throughout its history, Oracle has responded to technological advances with tools that enable customers to preserve their investment in business logic and applications development while exploiting the benefits of each new technological wave. Oracle Forms Developer has enabled companies to leverage character-based technology into client/server, and client/server technology into Web-deployed forms. Oracle Forms Services provides the underlying platform and built-in services that enable immediate exploitation of the benefits of each new technology while allowing redeployment of legacy forms with just a few changes to server configuration.

Forms Developer and Forms Services provide all of the traditional productivity benefits you'd expect in a Rapid Application Development (RAD) environment. Additionally, they have consistently provided insulation against technology shifts by allowing you to migrate your applications forward to take advantage of each new technology as it emerges. Protect your investment and migrate to the Internet with Oracle Forms Developer and Oracle Forms Services.

CONCLUSION

The demands placed on corporate information systems to readily adapt to changing business requirements and emerging technologies is overwhelming. Development teams are continually faced with demands for enhanced application functionality, improved user interfaces, and more complex, high-performance deployment configurations. Oracle Forms Developer and Oracle Forms Services provide a scalable, flexible architecture to automatically deliver high-performance, enterprise-class applications to all of your users. Oracle customers are using Oracle Forms Services to support thousands of users around the world, and

benchmarks have proven exceptional performance by running thousands of concurrent users.

By leveraging the Oracle Internet Platform through its openness and inherent scalability, Oracle Forms Developer and Oracle Forms Services provide an integrated delivery environment for Internet applications that automatically scale and perform.

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