

Oracle9i Release 2 Database on Windows: Development and Deployment

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Oracle9i Release 2 Database on Windows: Development and Deployment

EXECUTIVE OVERVIEW

With the release of Oracle9i Release 2 Database, Oracle enhances many features that make developing and deploying on the Windows platform easier, faster, and more cost-effective.

Application development has been greatly improved through new features on Oracle9i and Oracle9i Release 2 Windows data access. Developers have the flexibility to choose from five different Windows data access methods to accommodate their requirements: Oracle Data Provider for .NET (ODP.NET), Oracle Objects for OLE (OO4O), Oracle OLE DB, Oracle ODBC, and the COM Automation feature. These data access methods are fully integrated with the Microsoft Visual Studio and Microsoft Office product suites, including Visual Basic, Active Server Pages (ASP), and Internet Information Server (IIS). These data access methods have been enhanced with better globalization support with Unicode, XML support, and overall improved performance.

In Oracle9i Release 2, .NET developers can access the Oracle database via ODP.NET, OLE DB .NET, and ODBC .NET with any .NET language, such as C# and Visual Basic .NET. ODP.NET is a native Oracle .NET data provider that exposes Oracle's advanced functionality.

Application and mid-tier deployment using Oracle9i Release 2 on Windows is more robust and integrated. The Oracle Services for Microsoft Transaction Server (MTS) is redesigned to provide better availability and performance for transaction management on Windows. Oracle Fail Safe provides high availability solutions for Oracle software on one or more Windows clusters, while providing better integration and manageability. Oracle also integrates with Windows 2000 and Windows Server 2003 native security and Active Directory, allowing Oracle to operate in heterogeneous operating system and directory environments.

ORACLE ON WINDOWS

The Internet has provided unprecedented opportunity for enhancing commerce and collaboration. Organizations taking advantage of this new era of information management are rewarded with opportunities to reduce costs and increase revenue.

Many organizations choose the Windows operating system for a development and deployment infrastructure to provide their new computing needs.

With the first Oracle database release on Windows NT in 1993, Oracle had made a commitment to offer the best information management solutions available on Windows. Since that time, Oracle technology has adapted to the latest changes in Windows computing starting from the early client/server solutions to the Internet applications in the present. Today, Oracle remains a leader on the Windows platform through its world-class database and its close integration with the operating system's underlying technologies. Oracle has over twenty-five (25) years of data management expertise and is the leading vendor with the technology, experience, and services needed to deploy business-critical applications on Windows—whether on a corporate intranet or the Internet.

Oracle9i Release 2 for Windows provides all the features needed to run a business, whether it is used for departmental or company-wide deployment. It allows users to take advantage of the cost-effectiveness and ease of use of Windows, while providing the scalability, reliability, and performance traditionally available from Oracle. The future version of the Oracle database contains further enhancements for application integration on the Windows platform.

Two areas where Oracle has made considerable improvements are in *application development* and *deployment* on Windows.

APPLICATION DEVELOPMENT

One of the great benefits of using Oracle products is their immense flexibility by adhering to open standards. This fact is especially true when developing applications with Oracle9i Release 2 on Windows.

Oracle9i Release 2 provides flexibility for Windows application development by fully supporting multiple methods of COM and .NET data access. Additionally, Oracle has improved the feature set of these data access methods. Oracle9i Release 2 data access exposes new database features, such as .NET support, while providing better performance and stability.

With this immense choice in application development tools, Oracle allows businesses to employ the data access technology that best fits their feature and performance requirements. Developers are able to deploy their database applications more quickly by using the data access method with which they are most familiar, rather than having to learn a new one.

Oracle9i Release 2 provides a number of data access methods using native Windows technologies. COM data access using Visual Basic, Active Server Pages, or Visual C++ languages is popular among Windows developers. Oracle provides COM developers database access through three different programming interfaces: Oracle Objects for OLE, the Oracle Provider for OLE DB, and the COM Automation Feature. Oracle provides more traditional data access through the Oracle ODBC Driver. OLE DB and ODBC are often used through an

COM and Win32 application developers have four data access methods to the Oracle database: Oracle Objects for OLE (OO4O), OLE DB, ODBC, and the COM Automation Feature. From .NET, Windows developers can use ODP.NET, OLE DB .NET, or ODBC .NET.

automation layer, Microsoft ActiveX Data Objects (ADO). How all these COM data access methods interact with Oracle are shown in Figure 1.

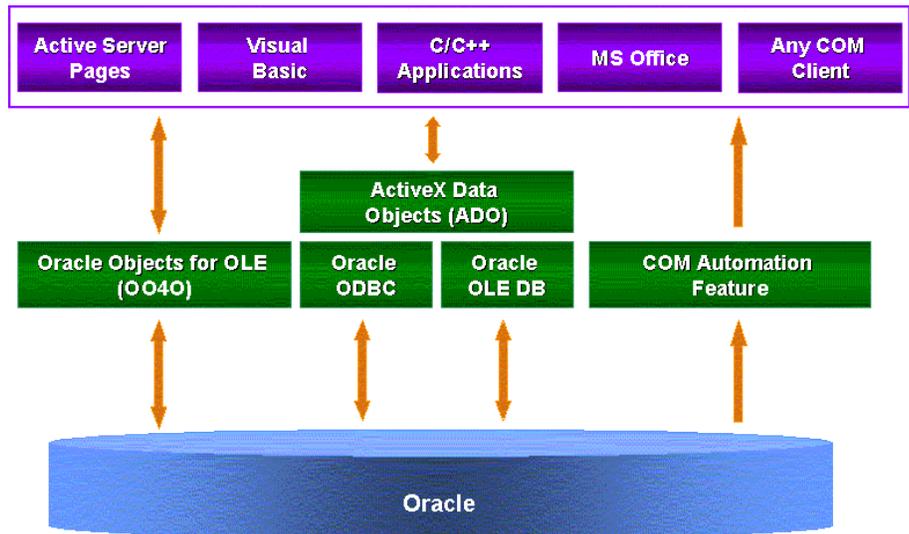


Figure 1: Oracle COM Data Access

Oracle9i Release 2 introduces .NET data access support with ODP.NET, OLE DB .NET, and ODBC .NET. These drivers allow Oracle databases to be accessible from any .NET language, such as C#, Visual Basic .NET, and ASP .NET. ODP.NET is a native .NET data access provider with direct access to Oracle. OLE DB .NET and ODBC .NET are interoperability layers provided by Microsoft. They allow users to access the full functionality of the Oracle OLE DB provider and the Oracle ODBC driver, respectively.

ODP.NET features fast database performance by allowing direct access to the database without an interoperability layer. Additionally, it exposes more of Oracle's advanced database functionality than any other .NET provider. All of these Oracle .NET data methods are shown in Figure 2.

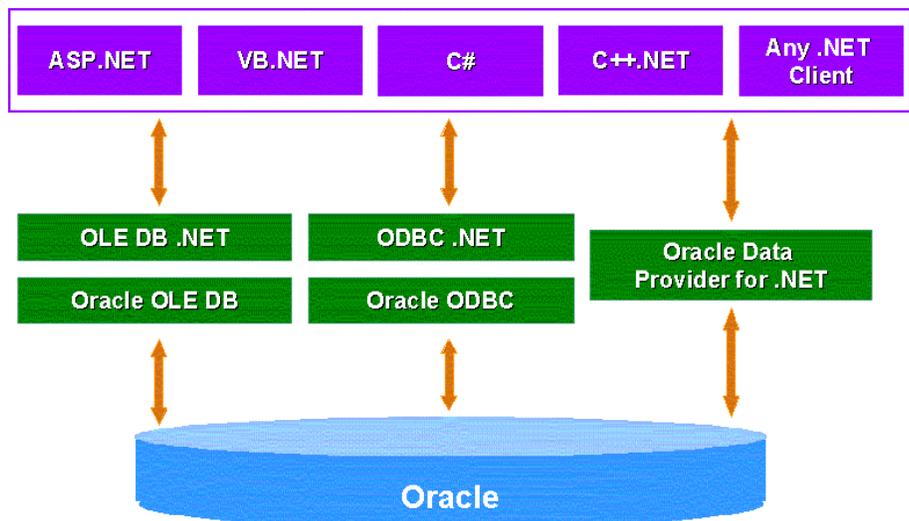


Figure 2: Oracle .NET Data Access

Because it is an Oracle native driver, OO4O does not incur the overhead of ODBC and OLE DB drivers. OO4O provides very fast performance and exposes the latest Oracle server features, such as XML support.

Oracle Objects for OLE

Oracle Objects for OLE (OO4O) are a COM-based database connectivity tool that combines optimized access to Oracle databases with easy to use interfaces. OO4O can be employed in a variety of environments, ranging from web applications to client/server applications. It is accessible from virtually any programming or scripting language that supports COM, such as Visual Basic, Visual C++, Microsoft Office, Active Server Pages, Internet Information Server (IIS), and MTS/COM+.

Because it is an Oracle native driver, OO4O provides fast performance on Windows clients to Oracle databases—it does not incur the overhead of ODBC and OLE DB drivers. OO4O has been developed and has evolved specifically for use with Oracle database servers. It provides easy access to advanced Oracle features that are otherwise cumbersome or inaccessible to use from ODBC and OLE DB-based components, such as ActiveX Data Objects (ADO).

OO4O consists of an in-process COM Automation Server, a C++ class library, and the Oracle Data Control. Architecturally, OO4O resides as a thin layer on top of the Oracle Call Interface (OCI), which provides much of the underlying database access plumbing. C/C++ programmers can use OCI directly. However, many Windows programmers use OO4O because of its ease of use and its accessibility from scripting languages, such as Visual Basic, unlike OCI.

OO4O permits access to all of Oracle's major database features including:

- Full support for PL/SQL, including seamless access to PL/SQL cursors
- Tunable client-side, scrollable, and updateable cursors

- Support for array fetches, updates, and inserts resulting in reduced network roundtrips
- Connection pooling to enhance middle-tier application scalability
- Multiplexing to allow user sessions to share an Oracle network connection, such as in a web environment
- Full support for MTS/COM+-coordinated transactions, including the new Oracle9i Services for MTS high availability and scalability architecture
- Seamless access to advanced Oracle data types:
 - Object References (REFs), Object Instances (Objects), Nested Tables, VARRAYs, BLOBs, CLOBs, NCLOBs and BFILEs
- Easy to use interface for describing schema objects
- Full support for accessing Advanced Queuing capabilities
- Asynchronous processing
- OO4O Code Wizard for Stored Procedures which generates VB or ASP code that executes PL/SQL and Java stored procedures
- XML support
- Full Unicode support allowing applications to be deployed globally
- Publication and subscription to database events allowing server-side events to initiate client-side actions and vice-versa.

ADO and the Oracle Provider for OLE DB

The Oracle OLE DB provider is built to handle the high volume and high loads of the Internet application environment. It is generally used through ADO from any COM environment, such as Visual Basic.

The Oracle Provider for OLE DB gives ADO developers high performance and efficient access to Oracle databases. OLE DB is a Microsoft data access specification that utilizes a set of COM interfaces for accessing and manipulating different types of data.

The Oracle OLE DB provider is an optimized version for Oracle databases, providing high performance and access to Oracle-specific database features, such as support for LOBs, PL/SQL, and REF Cursors. All these Oracle features and data access optimizations are generally not available in other third-party Oracle OLE DB providers and the OLE DB-ODBC Bridge. By adhering closely to the Microsoft OLE DB specification, the Oracle provider allows ADO developers to take full advantage of OLE DB without having to sacrifice using advanced Oracle functionality.

The Oracle Provider for OLE DB was built to improve data access functionality, performance, and reliability for ADO developers. The provider supports the following general database features:

- Scrollable and updateable rowsets

- Updateable rowsets created using joins (available with the client cursor engine)
- Local and distributed transactions
 - Distributed/MTS-coordinated transactions use new Oracle9i Services for MTS high availability and scalability architecture
- OS authentication, which allows Oracle to authorize users via the operating system's security mechanisms
- Database links
- Several schema rowsets
- ADOX
- Data shaping services with select statements
- Full Unicode support allowing applications to be deployed globally
- The provider supports the following Oracle-specific features:
 - PL/SQL
 - Procedures and functions returning multiple rowsets
 - Packaged and non-packaged PL/SQL
 - LOBs and N-data types
 - LOB parameters with stored procedures
 - Bind NCHAR parameters with SQL statements
 - Oracle Password Expiration feature

OLE DB .NET

The Oracle9i Release 2 OLE DB provider fully supports .NET data access via OLE DB .NET from any .NET programming language.

The Oracle9i Release 2 OLE DB provider supports ADO .NET using the OLE DB .NET interface. OLE DB .NET is an interoperability bridge between .NET and OLE DB that is provided by Microsoft. It shares a similar programming interface with other .NET data access interfaces, such as ODBC .NET and the SQL Server .NET data provider.

Oracle OLE DB is fully compliant with OLE DB .NET specification. It allows programmers to execute stored procedures and access LOBs. Whether Windows developers prefer to use COM or .NET, Oracle OLE DB's functionality is fully supported in either instance. Oracle OLE DB/OLE DB .NET supports all .NET languages, allowing any .NET developer to take advantage of the Oracle database.

Performance Enhancements

Oracle9i Release 2 OLE DB features higher performance over previous versions. Taking advantage of these performance enhancements does not require changing

existing application code. The performance improvements can be employed transparently by upgrading to the Oracle9i Release 2 OLE DB provider.

Oracle has optimized its OLE DB code in the rowset object and LOB manipulation. These objects are very commonly used in ADO/OLE DB programs. They were optimized by reducing the number of database roundtrips they made in their activities. Database roundtrips tend to be one of the most expensive operations for data access performance over a network. Developers should see immediate improvement in their existing application performance with Oracle9i Release 2 OLE DB.

ODBC

Traditional Windows applications can access the Oracle database server using the Oracle's latest ODBC driver, which provides new features and better performance.

The Oracle ODBC driver permits a more traditional way Windows applications can access the Oracle database server. Oracle ODBC is Version 3.51, Level 2 compatible. It provides a high performance method for accessing Oracle. Recently introduced functionality in Oracle9i ODBC includes:

- Expanded Unicode support
 - Unicode data types
 - SQL statements encoded in Unicode
- Multiple Oracle homes support
- Performance improvements in ODBC catalog functions
- Better scalability and availability with the Oracle9i Services for MTS

ODBC .NET

The Oracle9i Release 2 ODBC provider fully supports .NET data access via ODBC .NET from any .NET programming language.

The Oracle9i Release 2 ODBC driver supports ADO .NET data access using the ODBC .NET interface. As with OLE DB .NET, ODBC .NET is an interoperability bridge between .NET and ODBC that is provided by Microsoft. It too shares a similar programming interface with other .NET data access interfaces, such as OLE DB .NET and the SQL Server .NET data provider.

Oracle ODBC/ODBC .NET programmers have access to the same level of functionality as ODBC users from C/C++, including executing stored procedures and accessing LOBs. As such, Windows developers can use Oracle ODBC's full functionality from .NET, COM, or Win32. Oracle ODBC/ODBC .NET supports all .NET languages, allowing any .NET developer to use the Oracle database.

The Oracle Data Provider for .NET provides the highest performance method for accessing Oracle from .NET. It has the ability to support Oracle's newest advanced database functionality.

Oracle Data Provider for .NET

The Oracle Data Provider for .NET (ODP.NET) features optimized data access to the Oracle database from a .NET environment. Unlike OLE DB .NET and ODBC .NET, ODP.NET is a native driver and does not use a data access bridge, which can hinder performance. ODP.NET allows developers to take advantage of advanced Oracle database functionality. The data provider can be used from any .NET language, including C# and Visual Basic .NET.

ODP.NET makes using Oracle from .NET more flexible, faster, and more stable than OLE DB .NET and ODBC .NET. OLE DB .NET and ODBC .NET are generic interfaces designed with code portability in mind rather than optimizing for programmer flexibility and application speed. In the case of development flexibility, ODP.NET supports native Oracle data types, such as REF Cursors and LOBs. With ODP.NET, these REF Cursor variables are updatable and can be passed as input stored procedure parameters, giving developers more flexibility manipulating REF Cursors within .NET. Optimized LOB updates and support for array DML binding provide faster application performance.

ODP.NET is designed for scalable enterprise Windows solutions by providing full support for Unicode and local and distributed transactions. Distributed .NET transactions are supported through the Oracle Services for Microsoft Transaction Server.

COM Automation Feature

The Oracle COM Automation Feature allows PL/SQL and Java stored procedures, functions, and triggers to access COM Automation servers, such as Microsoft Office. This feature provides for the server to modify client-side applications, such as creating graphs in Microsoft Excel or sending email via Microsoft Exchange.

Oracle customers on Windows platforms often possess familiarity with COM Automation solutions. COM Automation allows the invocation of COM objects through the IDispatch interface. Among other uses, it is heavily employed in Visual Basic programming and provides a means for manipulating Microsoft Office applications and data through their Automation interfaces.

The COM Automation Feature provides PL/SQL and Java packages that allow stored procedure developers to call COM Automation servers. Stored procedure programmers can now access and manipulate any COM Automation Server, such as Microsoft Office. For example, the COM Automation Feature can be designed to automatically compile and graph sales data that resides in an Oracle database through a Microsoft Excel spreadsheet. Or it can be automated to email this data to certain sales managers using Microsoft Exchange. In fact, the COM Automation Feature is not limited to calling Microsoft COM objects; it can be used to manipulate any COM Automation server or custom COM Automation object.

The COM Automation Feature provides several main advantages:

- Straightforward APIs make it easy for PL/SQL and Java developers to incorporate COM Automation objects into their routines
- Preexisting COM Automation objects can be leveraged into Oracle solutions by calling them through the COM Automation Feature

- The Oracle database can be used to drive integration with other Windows applications

These PL/SQL and Java packages expose APIs to instantiate COM objects, get and set their properties, and invoke their methods. Developers can call these APIs from PL/SQL and Java subprograms, stored procedures, stored functions, and triggers. There are no restrictions as to where the COM objects can reside. They can be either local to the database server or be accessed remotely through the Distributed Component Object Model (DCOM).

APPLICATION DEPLOYMENT

Deploying applications on Windows requires close integration with native Windows services and middle-tier servers to ensure proper application interoperability. Oracle9i Release 2 provides this tight integration, allowing organizations to take advantage of core operating system and server functionality with Oracle's advanced feature set. Oracle's integration ensures transparent interoperability that is scalable, available, and secure. In this way, organizations can focus resources on building their application business logic, rather than correcting product incompatibilities or inefficiencies on Windows.

Oracle9i Release 2 includes many sets of tools for ensuring optimized application deployment environments. The Oracle Services for Microsoft Transaction Server feature a new design that makes transactional applications better performing, more scalable, and available. When deploying mission-critical Oracle servers on Windows clusters, Oracle Fail Safe ensures that those servers remain available by providing robust fail over support through the Microsoft Cluster Service. Oracle integrates with native Windows security tools that both improves database security and makes user management easier.

Oracle Services for Microsoft Transaction Server

Many Oracle customers on Windows platforms use Microsoft Transaction Server (MTS) in the middle-tier. MTS is an application server for COM objects and transactions in distributed environments. At the core of MTS is the Distributed Transaction Coordinator (DTC), which coordinates transactions between distributed resource managers. In Windows 2000, the MTS executive is replaced by enhancements to COM+ services. With the introduction of .NET, it is now part of .NET Enterprise Services.

The Oracle Services for Microsoft Transaction Server integrate the DTC with Oracle databases. The services, which act as a proxy, allow customers to use Oracle databases as resource managers in DTC-coordinated transactions. Specifically, the services provide the following transaction operations:

- Enlistment - Context maintenance for global transactions
- Completion - Translation of two-phase commit calls between DTC and Oracle

Oracle provides many different tools that integrate Oracle applications into Windows environments, including Oracle Services for MTS, Oracle Fail Safe, Windows security integration, and Active Directory integration.

With the newly redesigned Oracle Services for MTS, each MTS server can host its own Oracle Services. This eliminates having a single point of failure for Windows applications, which improves availability and performance.

- Recovery - Resolution of in-doubt DTC transactions
- Connection pooling - Caching of transactional database connection resources

In Oracle9i and Oracle9i Release 2, the Oracle Services for MTS feature a new architecture for improved performance, scalability, and availability. Previously, each database was associated with only one resource manager proxy that participated in DTC transactions on behalf of the database. An integration layer for the Oracle Services for MTS allowed middle-tier applications to participate in transactions. Additionally, the Oracle Services for MTS ran as a Windows service, requiring extra-process communication with MTS.

The new Oracle Services for MTS architecture improves greatly over this previous design. Each MTS server now maintains its own cache of resource manager proxies, so that any database may have numerous proxies associated with it. This cache of proxies is maintained by the Oracle Services for MTS integration layer, which runs directly inside the MTS server process. This integration layer handles transaction enlistment and completion among the application, DTC, and database.

In a multiple MTS deployment, this model leads to better availability because no proxy can become a single point of failure. Moreover, it leads to better overall performance as no single proxy can become a bottleneck to the database and extra-process communication has been reduced by moving the Oracle Services for MTS integration layer into the MTS process.

In Oracle9i and Oracle9i Release 2, each MTS server runs a recovery daemon. Recovery is driven by the database, which requests the final outcome of in-doubt transactions through reenlistment. A PL/SQL package runs a periodic recovery job, which contacts the recovery daemon associated with the dubious transaction. The daemon requests the transaction result from DTC and informs the database of the result. A database administration account, named MTSSYS, is created upon installation for DTC recovery.

The Oracle Services for MTS allow developing applications with a variety of data access interfaces, including ODP.NET, OO4O, OCI, ADO/OLE DB, and ODBC. In general, ODP.NET, OO4O, and OCI provide better performance and compatibility with Oracle. ODP.NET, OO4O, and OCI use optimized connection pooling provided by Oracle's resource dispensers. The Oracle Provider for OLE DB and the Oracle ODBC driver employ Microsoft resource management for database connections.

Although the Oracle Services for MTS itself only runs on Windows, it can operate with Oracle databases on any operating system. This situation is ideal for customers using a Windows middle-tier to access UNIX-based Oracle servers.

Oracle9i Release 2 Services for MTS fully support running transactional .NET applications.

.NET Support

In Oracle9i Release 2, the Services for MTS fully support transactional .NET programs running against the Oracle database. Developers will be able to use the new scalable architecture of Oracle Services for MTS in a .NET environment. To employ the Services for MTS from .NET, programmers can use any of Oracle's .NET data access methods: OLE DB .NET/Oracle OLE DB, ODBC .NET/Oracle ODBC, and the Oracle Data Provider for .NET. Whether using .NET or COM, Oracle Services for MTS users will have the same robust functionality available to them.

Oracle Fail Safe

Through integration with the Microsoft Cluster Service, Oracle Fail Safe ensures Oracle software remains highly available on Windows. Fail Safe supports the Oracle database, application server, and E-Business Suite,

Oracle Fail Safe is a core feature of Oracle9i Release 2 that provides high-availability for mission-critical solutions deployed on Windows clusters. A cluster eliminates individual host systems as points of failure. Oracle Fail Safe works with Microsoft Cluster Service (MSCS) to ensure that if a failure occurs on one cluster node, then the Oracle databases and applications running on that node will fail over (move) automatically and quickly to a surviving node.

Oracle Fail Safe is optimized for Windows customers with database and application workloads that can be handled by a single system. Oracle Fail Safe solutions can be deployed on all commodity Windows NT, Windows 2000, and Windows Server 2003 clusters. It supports up to eight-node clusters on Windows Server 2003 Datacenter, the maximum node configuration available on Windows today. Supported products include:

- Oracle databases (Oracle9i, Oracle8i, and Oracle8)
- Oracle Applications release 11i
- Oracle iAS, with the exception of Oracle9i Caches, including
 - Oracle Forms Server
 - Oracle Reports Server
 - Oracle HTTP Server
- Oracle Services for Microsoft Transaction Server (Oracle8i Release 3)
- Oracle Intelligent Agent
- Applications installed as Windows services

SAP, Baan, PeopleSoft, Lawson, J.D. Edwards, and other applications vendors also have validated their software solutions with Oracle Fail Safe.

Oracle Fail Safe includes two main components, a server and a manager. The server component, Oracle Services for MSCS, works with the cluster software to ensure fast automatic fail over during planned and unplanned outages. The manager, Oracle Fail Safe Manager, is an easy-to-use graphical interface that works with Oracle Fail Safe Server on one or more clusters to perform configuration,

management, verification, and static load balancing. Together, these components provide a rich set of features and integrated troubleshooting tools that enable rapid deployment of highly available databases and applications—complete e-business solutions.

Logical/Physical Standby

With Logical/Physical Standby integration, the Oracle Fail Safe database can be run on a primary site and any remote standby sites. Fail Safe will monitor the database, bring it online, and take it offline. This allows customers to have single instance fail over within a cluster with minimal downtime, along with added benefits of maintaining standby sites. Oracle Fail Safe is commonly used for planned failovers, such as software/hardware upgrades common to Windows environments. With Logical/Physical Standby, Fail Safe now provides true disaster protection offered by standby. Together, the two products compliment each other to provide higher availability and disaster protection than with either product alone.

Multi-cluster Manageability

For customers with multiple cluster deployments, Oracle Fail Safe Manager now permits the display of more than one cluster, allowing the user to manage all clusters from the same window, rather than from a separate window for each cluster. Administrators, for example, will be able to modify the database account credentials for databases across all their Fail Safe clusters using a single wizard all at once. Administrators will be able to avoid the tedious nature of comparing policies or modifying cluster display or alert preferences individually.

Security

Oracle9i and Oracle9i Release 2 provide tight integration with the native Windows security model to better safeguard application security. Windows 2000 and Windows Server 2003 have numerous technologies implementing Microsoft's public key infrastructure (PKI) security. Oracle includes two features that improve usage of the Oracle PKI on Windows:

- Oracle wallets in Windows registry
- Microsoft Certificate Store integration

Oracle Wallets in Windows Registry

Oracle wallets can now be stored in the Windows registry, providing increased security for Oracle wallets on Windows clients. Without this feature, Oracle wallets are often stored on the Windows file system. If the operating system file permissions are not secure, the Oracle wallets are also insecure. Insecure file permissions may come from improper administration or lack of operating system file security, such as on Windows 98. On Windows systems, therefore, PKI security is improved by storing Oracle wallets in the user profile area of the

Oracle Fail Safe supports disaster protection by enabling Logical/Physical Standby support. For improved manageability, multiple clusters now can be managed from the same console.

The ability to store Oracle wallets in the Windows registry eliminates the insecure operating system file storage. Oracle integrates with the Microsoft Certificate Store allowing Oracle PKI and Windows PKI applications to operate together seamlessly.

Windows registry. This registry area is accessible only to the properly logged-in user. Multiple Oracle wallets can be used and stored from the profile area.

Single sign-on for Oracle PKI applications is enabled through the Oracle Wallet Manager and Oracle Enterprise Login Assistant tools. The Wallet Manager creates encrypted Oracle wallets, while the Enterprise Login Assistant creates the decrypted wallet. The decrypted wallet is then used by Oracle PKI applications for SSL authentication. Both of these tools are enhanced to support the storage and location of Oracle wallets in the registry, as well as the default file system if required.

Microsoft Certificate Store Integration

Oracle's integration with the Microsoft Certificate Store allows Oracle PKI applications to interoperate with products that use Windows PKI. When this feature is enabled, Oracle PKI security uses Microsoft CryptoAPIs to access the Microsoft Certificate Store. The CryptoAPIs are used for operations, such as signing, encryption, decryption, verification, and validation. The Wallet Resource Locator (WRL) determines the PKI type and other relevant information.

With this feature, Oracle and non-Oracle applications can leverage the same set of PKI credentials (such as certificates, keys, revocation lists, and trustpoints) for public key security services, such as authentication and encryption.

Directory

Directory servers often make user and resource management easier by centralizing administration. Oracle Internet Directory (OID) allows enterprises to centralize their directory servers and leverage their existing directory servers, such as Active Directory. Oracle9i includes two features that leverage both OID and Active Directory (AD) on Windows:

- Native authentication and AD
- Oracle Net naming with AD

Native Authentication and Active Directory

Oracle customers often require enterprise-scale security and schema management. This is especially true for businesses with large user populations. OID is designed to handle these enterprise environments and interoperate with departmental directory servers, such as Active Directory. Oracle security and administration are integrated with both these directory servers to provide seamless access and administration.

Oracle provides native authentication through Windows authentication mechanisms, allowing the operating system to perform user identification for Oracle databases. Oracle supports the core Kerberos security protocol on Windows 2000 and Windows Server 2003. With native authentication enabled, users can leverage single sign-on to access Oracle simply by logging onto

Oracle makes single sign-on possible and user management easier with Windows by allowing user mappings to be stored in Active Directory or in Oracle Internet Directory (OID). Moreover, Net naming (tnsnames.ora) can now be stored in either Active Directory or OID for centralized management.

Windows, reducing end-user administration and eliminating redundant security credentials. In the future, Oracle Internet Directory for Windows plans to enable OID clients to respect Microsoft Kerberos tickets for unified authentication across Windows and non-Windows infrastructures.

Oracle enterprise user mappings allow many operating system users to access multiple databases as a single global database user. In Windows-only environments, these enterprise user mappings may be stored in Active Directory. For instance, an entire LDAP organizational unit (OU) in Active Directory can be mapped to one database user.

Oracle stores enterprise role mappings in LDAP. On Windows, this LDAP storage feature is certified on OID as well as with Active Directory. With enterprise roles, privileges for multiple databases can be managed at the domain level through directories. This is accomplished by assigning Windows users and groups to the Oracle enterprise roles registered in the LDAP store.

Oracle Net Naming with Active Directory

Oracle leverages LDAP technology through OID and Active Directory to improve database connectivity information management. Traditionally, end-users reference databases with Net-style names resolved through the TNSNAMES.ORA configuration file. This file must be administered on each client machine. With Oracle, Net names can be stored and resolved through OID or Active Directory. Centralizing such information in a directory eliminates administrative overhead and relieves users from configuring their individual client machines.

Furthermore, Windows 2000 and Server 2003 tools, such as Windows Explorer and Active Directory Users and Computers, can now connect to databases and test database connectivity. Oracle tools have also been enhanced. The Oracle Database Configuration Assistant automatically registers database objects in an LDAP directory. The Oracle Net Manager, meanwhile, registers net service objects with the directory. These enhancements further simplify administration.

CONCLUSION

As technology in Windows application development and deployment has evolved from client/server to the Internet, so has Oracle. Oracle9i Release 2 Database offers unprecedented flexibility for customers to choose the application tools and architecture that fit their requirements without sacrificing performance, scalability, ease of use, and security. Oracle's commitment to the Windows platforms includes new integration with the .NET infrastructure. By designing Oracle9i Release 2 with Windows in mind, customer software applications can achieve seamless interoperability between the operating system and the database.

For more information about Oracle on Windows, visit

<http://otn.oracle.com/tech/windows/>

<http://www.oracle.com/ip/deploy/database/oracle9i/platforms/windows.html>



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