

Oracle9i: Developing with Microsoft .NET

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Oracle is fully committed to supporting Microsoft's Windows Server 2003 operating system (32-bit and 64-bit) when it becomes available. Oracle 9i developer's release for 64-bit Windows has been available through OTN since early Dec. '01. Oracle 9i also supports Windows XP.

EXECUTIVE OVERVIEW

Microsoft's .NET framework covers a broad area. The areas that the Oracle database server integrates with .NET can be categorized into 3 groups; Windows Server 2003 (formerly known as .NET server), CLI (Common Language Infrastructure) which describes a programming paradigm including a Common Language Runtime (CLR) and various data access mechanisms and finally the .NET tools and services such as Visual Studio.NET, .NET transactions, web services, etc. Oracle is committed to supporting its server products on Windows Server 2003 (32-bit and 64-bit) when it becomes available (currently scheduled for April 24, 2003).

Oracle9i Release 2 Database introduces new support for .NET developers. The database enables .NET data access through OLE DB .NET or ODBC .NET. This gives programmers using any .NET language, such as C# or Visual Basic .NET access to an Oracle database. Oracle also has a native driver for .NET data access called Oracle Data Provider for .NET (ODP.NET) which is Oracle's implementation of ADO .NET specs that is optimized for high performance and access to advanced Oracle features, such as REF Cursors, XML DB, etc. It is available on the Oracle Technology Network (<http://otn.oracle.com/tech/windows/odpnet>). The database will continue to be able to participate in .NET transactions.

Visual Studio.NET developers can also seamlessly develop and deploy .NET applications with the Oracle database in the back-end. There are a myriad of integration points through Visual Studio.NET that allow database, table and stored procedure browsing and manipulation among other things.

The Oracle9i Release 2 Application Server (Oracle9iAS) supports Simple Object Access Protocol (SOAP), Web services Description Language (WSDL), and Universal Description, Discovery, and Integration (UDDI) as the primary standards to develop Web services. Web services developed using Oracle9iAS and Oracle9i JDeveloper can inter-operate seamlessly with .NET Web services. Oracle9iAS can provide advanced features and improve performance of .NET servers through advanced web caching, portal services, business intelligence, wireless services, and the Internet Information Server (IIS) Proxy Plugin.

Visual Studio .NET developers also have the option to build Web services directly with the Oracle 9i Database by dragging and dropping stored procedures into their project and get them deployed as Web services running Microsoft IIS.

INTRODUCTION

Oracle has always committed to making its software open so that customers can choose the technology that best fits their needs. Because of this belief in openness, Oracle has been at the forefront of the latest technologies. In Oracle's early days, this commitment began by offering its flagship database on numerous operating systems, more than any other vendor offered. Oracle continues this trait by supporting various enabling platform technologies such as an early adoption of Java2 Enterprise Edition, COM, and now .NET.

SUPPORT FOR THE WINDOWS SERVER 2003

32-bit support

Oracle has provided support for the Windows 16 and 32 bit operating system family since 1993 and is fully committed to supporting the next release of the Windows 32-bit OS. Oracle will support the 32-bit Windows Server 2003 simultaneously with the OS availability.

64-bit support

Oracle has been one of the first database vendors to provide software on the 64-bit environment. A demonstration version Oracle8i V 8.1.6 on 64-bit is available and we have had the database running on real 64-bit hardware since Oct. '99. Oracle had a developer's release of the Oracle9i database for Windows 64-bit early Dec. '01 and two beta releases subsequent to that. Oracle will have a production version of its 64-bit database simultaneous with the availability of the 64-bit Windows Server 2003.

.NET DATA ACCESS

There are 3 Oracle methods for .NET data access that can be invoked by any .NET compliant programming language. These data access drivers provide high performance and compliance with the latest .NET specifications. ODBC .NET and OLE DB .NET use the Oracle database ODBC and OLE DB drivers. These drivers have been thoroughly tested with .NET to ensure stability and high performance. Oracle also provides the Oracle Data Provider for .NET which is a native implementation. Oracle recommends this as the preferred .NET data access method.

Developers could also invoke some of Oracle's COM based data access methods through the .NET programming framework. Oracle COM Automation feature

Oracle 9iR2 introduces full support for .NET data access through Microsoft's CLR based languages via a number of methods.

which allows callouts to COM clients from the database could also invoke a .NET application/Web Service. Developers could also use Java stored procedures to call Web services from the database.

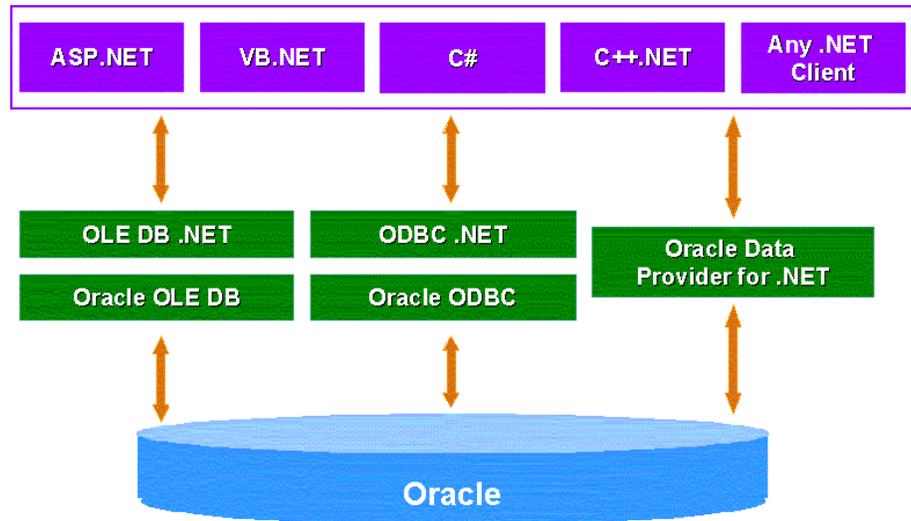


Figure 1: .NET Data Access to Oracle

Oracle Data Provider for .NET

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.

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 does not use a data access bridge, which can reduce 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. This is currently in production.

ODP.NET makes using Oracle from .NET more flexible, faster and more stable than OLE DB .NET and ODBC .NET. These are generic interfaces designed with code portability in mind rather than optimizing for programmer flexibility and application speed. For example, ODP.NET supports native Oracle data types, such as REF Cursors. With ODP.NET, these REF Cursor variables are updateable and can be passed as IN parameters to stored procedures, 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. ODP .NET complies with standards and also provides Oracle specific features.

OLE DB .NET support

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.

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. OLE DB .NET which uses the Oracle provider for OLE DB supports all .NET languages, allowing any .NET developer to take advantage of the Oracle database. Oracle recommends using Oracle's OLE DB driver when using OLE DB .NET

ODBC .NET support

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.

Oracle ODBC/ODBC .NET programmers have access to a rich set of functionality, including executing stored procedures and accessing LOBs. As such, Windows developers can use Oracle ODBC's full functionality from .NET, COM, or Win32. ODBC .NET which uses the Oracle ODBC driver supports all .NET languages, allowing any .NET developer to use the Oracle database. Oracle recommends using the Oracle ODBC driver when using ODBC .NET.

.NET transactions

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. 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.

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.

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

VISUAL STUDIO .NET AND THE .NET FRAMEWORK

Visual Studio .NET is Microsoft's newest IDE (Integrated Development Environment) for developers. In addition to supporting Microsoft's traditional programming languages (such as VB and C++) and programming APIs such as COM and COM+, it also supports the .NET programming framework. It allows developers to write applications in any CLR based language (VB .NET, C#, C++ managed extensions, etc.) and be able to deploy them in many ways such as applications, web services, etc..

The Visual Studio .NET development environment has many integration points that provides for a very easy and seamless development experience against the Oracle RDBMS. The following are some of the integration points:

- **Server Explorer:** In VS .NET, the Server Explorer provides database object browsing capabilities. It allows the developer to pick Microsoft's OLE DB driver and connect to a data source such as Oracle. When connected to the Oracle data connection node the developer can see all the child nodes which includes Database diagram, Tables, Views, Stored Procedures, etc. plus some Oracle specific features such as Synonyms, Package specifications and package bodies.

- **Database Diagrams** allows the developer to visually view the Entity-Relationship model and manipulate it. **Table Designer** allows the developer to view and manipulate tables. **View and Query Designer** lets the developer drag tables and visually define links to create a query or view.

- **Stored Procedure/Function/Trigger support:** The Visual Studio .NET IDE allows creation and manipulation of stored procedures in the server explorer. It provides a simple template to start developing the stored procedure/function/trigger.

- **Drag and Drop/Retrieve Data:** Server Explorer lets Oracle objects such as tables and stored procedures be dragged and dropped into certain types of projects to automatically generate database access code. VS .NET Retrieve Data feature allows for quick browsing of the contents of a table or view.

Web services and .NET

Web services consist of a set of messaging protocols, programming standards, and network registration and discovery facilities that expose business functions to authorized parties over the Internet from any web-connected device. Web services are business processes that do the following:

- Expose and describe themselves,
- Allow other services to locate them on the web,
- Are invocable,
- Return a response (depending on the type of the web service, this can either be a simple request/response function in the case of simple Web services or a long running transactional conversation in the case of Complex Web services that involve sophisticated security, business to business collaboration and business process management),
- Optionally offer appropriate internal business processes.

Oracle supports SOAP (Simple Object Access Protocol), WSDL (Web services Description Language), and UDDI (Universal Description, Discovery, and Integration) as the primary standards to develop Web services. Web services developed with Oracle's products can inter-operate seamlessly with those developed to Microsoft's .NET architecture. In general there are 2 ways that developers can write Web services or .NET applications using the Oracle database:

- Use Oracle9i Application Server and the Oracle9i Database:
Developers can use Oracle tools such as Oracle9i JDeveloper to build and deploy Web services taking advantage of all the Oracle9iAS advanced features. There is also the choice of using IIS as a web listener and using the IIS proxy plug-in to interact with Oracle9iAS.
- Using only IIS in the mid-tier against an Oracle database back-end:
Developers can develop their apps (ASP .NET, VB .NET, etc./Web services using Visual Studio .NET and deploy them in IIS going against the Oracle 9i Database.

Developers could also invoke web services by calling out of the Oracle RDBMS from a PL/SQL or a Java stored procedure.

For further information on Oracle's Windows products, please visit:

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

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



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