.NET Development with ODAC 12c Release 4

Oracle Data Access Components (ODAC) offers four components that simplify .NET development with the Oracle Database: Oracle Data Provider for .NET, Oracle Developer Tools for Visual Studio, Oracle Providers for ASP.NET, and .NET stored procedures. In ODAC 12c Release 4, Oracle includes Microsoft Visual Studio 2015 and .NET Framework 4.6 certification; a native Microsoft installer; more ODP.NET, Managed Driver security and high availability features; enhanced schema comparison and deployment script generation tools in Visual Studio; and more. ODAC can be downloaded from Oracle Technology Center (OTN) for free and is installable on 32-bit or 64-bit platforms via Oracle Universal Installer, xcopy, NuGet, or Microsoft Installer.

KEY BENEFITS

- Easy to use and learn
- No charge
- Visual Studio 2015 and .NET Framework 4.6 certified
- Native Windows installer
- Enhanced ODP.NET security and high availability features
- Supports Oracle database 12c features, such as multitenant container databases and Transaction Guard
- Access all database editions, including Express, and database versions 10.2 and later

Oracle Data Provider for .NET

Oracle Data Provider for .NET (ODP.NET) features optimized ADO.NET data access to the Oracle database while providing full accessibility to the latest .NET Framework 4.6 and features, such as Entity Framework 6 Code First. ODP.NET developers can take advantage of Oracle's unique database functionality, including Real Application Clusters, performance optimizations, Transaction Guard, and multitenant container databases. ODP.NET gives .NET programmers better performance, flexibility, and more feature availability through features, such as self-tuning and faster data retrieval; TimesTen In-Memory Database provider support, and promotable transactions. ODP.NET developers can use the .NET Framework, but not have to sacrifice powerful Oracle data management capabilities.

For more information, visit ODP.NET home page.

Oracle Developer Tools for Visual Studio

Oracle Developer Tools for Visual Studio (ODT) is a tightly integrated "Add-in" for Microsoft Visual Studio 2015, Visual Studio 2013, and Visual Studio 2012.

ODT makes developing .NET code for Oracle easy and fast, allowing developers to stay in Visual Studio for the entire development lifecycle. ODT makes it easy to browse and edit Oracle schema objects using integrated visual designers and can automatically generate .NET code via a simple drag and drop. Developers can easily modify table data, execute Oracle SQL statements, edit and debug PL/SQL code, and generate SQL deployment scripts. The integrated context sensitive online help, including the Oracle SQL and PL/SQL Users Guides, puts the Oracle documentation at their fingertips.

ORACLE®

ODT includes a SQL Tuning Advisor tool to help developers tune arbitrary SQL statements and an Oracle Performance Analyzer, which analyzes a running .NET application's use of the Oracle database and provides detailed recommendations.

ODT and ODP.NET are seamlessly integrated with Oracle Database 12c multitenant container databases (CDBs) allowing developers to easily and quickly create, clone, plug or unplug pluggable databases (PDBs) for use during development and testing. These PDBs can be viewed and managed directly from Server Explorer in Visual Studio. ODP.NET works out of the box with PDBs, requiring no code changes to use them in .NET.

ODT includes Schema Compare tools integrated within Visual Studio. These tools allow developers to detect changes between individual Oracle schema objects or entire schemas. When it comes time for deployment, these tools can be used to generate a deployment ("diff") script to upgrade the target database to include the new schema changes required.

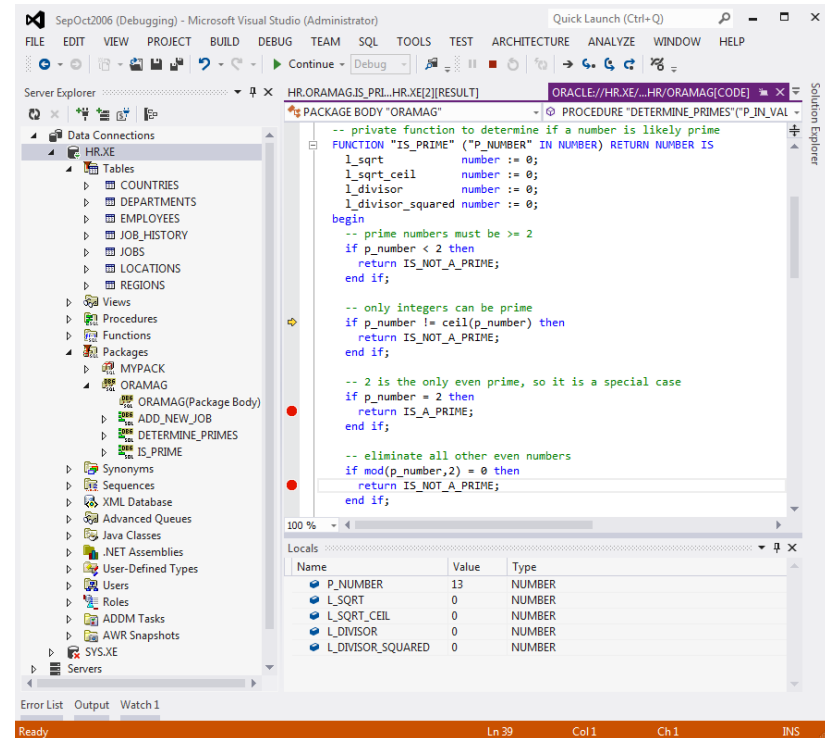For more information, visit Oracle Developer Tools for Visual Studio home page.

Figure1. Browsing the Oracle schema (left) and editing and debugging PL/SQL (right) are just two examples of Oracle's tight Visual Studio integration.

Oracle Providers for ASP.NET

ASP.NET includes service providers that store application state in databases. By storing state in a database, applications ensure web data is highly available and equally accessible among all web servers.

Oracle Providers for ASP.NET support these service providers for use with the Oracle database. For developers already familiar with ASP.NET providers, the Oracle Providers for ASP.NET are easy to learn since they share a common schema and

application programming interface with other existing ASP.NET providers.

Standard ASP.NET controls and services interact with the providers transparently without any Oracle-specific coding required. Oracle offers the following ASP.NET providers: Membership Provider, Role Provider, Site Map Provider, Session State Provider, Profile Provider, Web Events Provider, Web Parts Personalization Provider, and Cache Dependency Provider.

For more information, visit Oracle Providers for ASP.NET home page.

.NET Stored Procedures

The Oracle Database Extensions for .NET is a feature of Oracle Database on Windows that makes it easy to develop, deploy, and run stored procedures and functions written in a .NET managed language, such as C# or VB.NET. .NET stored procedures or functions are developed using Microsoft Visual Studio and deployed using the tightly integrated ODT .NET Deployment Wizard. After deployment, a .NET stored procedure can be called from .NET; from SQL or PL/SQL; from another .NET, PL/SQL, or Java stored procedure; from a trigger; or from anywhere else a stored procedure or function call is allowed.

For more information, visit the Oracle Database Extensions for .NET home page.

New Features

Microsoft Visual Studio 2015 and .NET Framework 4.6 Support

All ODAC 12c Release 4 components are certified for Visuals Studio 2015 and .NET Framework 4.6. Visual Studio 2015 developers can access all of ODT's features at design-time. ODP.NET, Oracle Providers for ASP.NET and .NET stored procedures are certified for .NET Framework 4.6 at runtime.

Microsoft Installer

ODAC 12c Release 4 introduces support for Microsoft Installer (MSI), the native Windows software installer. MSI is a familiar installation tool for Windows developers, making it easy to install or package the ODAC release. This install includes ODT; ODP.NET, Managed Driver; and Oracle Providers for ASP.NET.

Security – ODP.NET, Managed Driver

ODP.NET, Managed Driver adds a number of security features in the latest release.

Network Data Encryption
Network data encryption converts plaintext data into unintelligible ciphertext based on a key that makes it computationally infeasible to convert back to plaintext without the correct key. ODP.NET, Managed Driver supports the Advanced Encryption Standard (AES), RSA RC4, and Triple-DES (3DES) symmetric cryptosystems for protecting the confidentiality of Oracle network traffic.

Secure External Password Store (SEPS)
SEPS is a client-side wallet used to store Oracle database connection password credentials. Wallet usage simplifies large-scale deployments that rely on database password credentials. Applications no longer need embedded user names and

passwords, which reduces risk as passwords are no longer exposed and password management policies are more easily enforced. ODP.NET, Managed Driver supports storing password credentials using SEPS.

Microsoft Local Security Authority (MSLSA)
ODP.NET, Managed Driver can use Windows logon credentials as Kerberos client credentials, which is called MSLSA-based Kerberos authentication.

"Offline" Schema Comparison in Visual Studio

The Schema Compare tools included with Oracle Developer Tools for Visual Studio now add support for performing a schema comparison between a set of SQL scripts stored in an Oracle Database Project and an Oracle Database instance. The scripts in the Oracle Database Project can be automatically updated to reflect changes in the database instance and vice versa.

NuGet – Oracle Providers for ASP.NET

Oracle Providers for ASP.NET are available in a NuGet package. This capability simplifies distributing these providers to developers and end users.

Oracle Providers for ASP.NET and ODP.NET, Managed Driver

Oracle Providers for ASP.NET for .NET Framework 4 and higher now depend on ODP.NET, Managed Driver, rather than ODP.NET, Unmanaged Driver as in previous releases. In addition, Oracle Providers for ASP.NET for .NET Framework 4 and higher is now a platform independent assembly, enabling platform independent applications to simply use the same .NET assembly, regardless of the platform. Oracle Providers for ASP.NET for .NET Framework 2.0 remains platform dependent and will continue to depend on ODP.NET, Unmanaged Driver.

High Availability – ODP.NET

Managed and unmanaged ODP.NET enhance application high availability capabilities with the following new features:

Service Relocation Connection Timeout
Whenever a database service becomes unavailable, an application can encounter numerous connectivity errors via connection attempts to an unavailable service. With the new service relocation connection timeout setting, ODP.NET, Managed and Unmanaged Drivers will block any connection attempts until the service is up or until the configured timeout expires (from the time when the service DOWN event was received). This feature is intended for planned outage and service relocation scenarios. It limits the timeout errors users normally see so that there is enough time for service relocation. This feature works with Oracle RAC and Oracle Data Guard.

Transaction Guard – ODP.NET, Unmanaged Driver
Transaction Guard returns the outcome of the last in-flight transaction after an outage, which makes the database session unavailable. Without Transaction Guard, users who attempt to retry operations following an outage can cause logical corruption by committing duplicate transactions or committing transactions out of order. ODP.NET, Unmanaged Driver has supported Transaction Guard since its introduction in Oracle Database 12c. New for ODAC 12c Release 4, unmanaged ODP.NET's Transaction Guard APIs have been streamlined to reduce transaction recovery application logic

complexity. Developers will find it easier to utilize Transaction Guard in their unmanaged ODP.NET applications.

Transaction Guard – ODP.NET, Managed Driver
ODP.NET, Managed Driver now supports Transaction Guard. The APIs and architecture are the same as ODP.NET, Unmanaged Driver's in ODAC 12c Release 4 to provide improved developer productivity.

Distributed Transactions – ODP.NET, Unmanaged Driver

For .NET Framework 4.5.2 and higher, ODP.NET, Unmanaged Driver has embedded a managed Oracle Services for Microsoft Transaction Server (OraMTS) implementation into its assembly. Unmanaged OraMTS remains the default for the ODP.NET, Unmanaged Driver, but the managed OraMTS implementation is recommended if a fully managed solution is desired or when using any high availability Oracle Fast Application Notification events with Oracle Real Application Clusters or Oracle Data Guard. The managed OraMTS implementation supports this high availability functionality, while the traditional OraMTS does not.

SQL Translation Framework – ODP.NET, Unmanaged Driver

Oracle SQL Translation Framework helps migrate existing .NET applications that use vendor-proprietary SQL syntax to semantically-equivalent Oracle syntax. The framework automatically translates non-Oracle SQL to Oracle SQL, thereby enabling existing application code to run largely unchanged against an Oracle Database. This reduces the migration cost to Oracle Database significantly.

Get Started Today

You can quickly start developing .NET applications with Oracle databases. Just download ODAC 12c Release 4 from ODAC OTN download page.

Find getting started tutorials at the OTN .NET Developer Center.

ORACLE®

CONNECT WITH US

otn.oracle.com/dotnet

twitter.com/oracleDOTNET

youtube.com/OracleDotNetTeam

Integrated Cloud Applications & Platform Services

Oracle is committed to developing practices and products that help protect the environment