



# .NET Development with ODAC 19c

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. ODAC 19c release adds new support for Microsoft Entity Framework Core, Visual Studio 2019, and Autonomous Database (ADB) integration in Visual Studio enabling browsing and managing ADB resources. ODAC is a free [download](#). It can integrate with 32-bit and 64-bit applications and is installable via Microsoft Installer, NuGet, xcopy, or Oracle Universal Installer.

## ORACLE DEVELOPER TOOLS FOR VISUAL STUDIO

Oracle Developer Tools for Visual Studio (ODT) is a tightly integrated extension for Microsoft Visual Studio 2019 and Visual Studio 2017.

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. Developers can easily modify table data, execute Oracle SQL statements, edit and debug PL/SQL code, and generate SQL deployment scripts.

ODT includes Oracle Cloud Explorer which allows developers to connect, browse and manage Autonomous Database (ADB) resources easily and intuitively. Developers can quickly create Always Free ADB instances, automatically download credentials files and be connected to the database to

### Key Benefits

- No charge
- Entity Framework Core and .NET Core support
- Visual Studio 2019 certified
- Tools and data access for Oracle Database Cloud, including Oracle Autonomous Database
- Easy cloud deployment
- Access all on-premises database editions, including Express Edition, and versions 11.2 and later

work on their code within minutes. All ADB features are supported, including Autonomous Database Dedicated and Autonomous Data Warehouse.

Oracle Database 19c multitenant container databases (CDBs) are integrated into Server Explorer, allowing developers to easily and quickly create, clone, plug or unplug pluggable databases (PDBs) for use during development and testing.

The SQL Tuning Advisor tool helps 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.

Schema Compare tools allow developers to detect changes between individual Oracle schema objects or entire schemas. Schema comparisons can be performed against live database instances or against a set of SQL scripts stored in an Oracle Database Project.

For Visual Studio 2019 developers, ODT is available on Oracle's website as a single small footprint .VSIX file for simplified installation.

For more information, visit [Oracle Developer Tools for Visual Studio website](#).

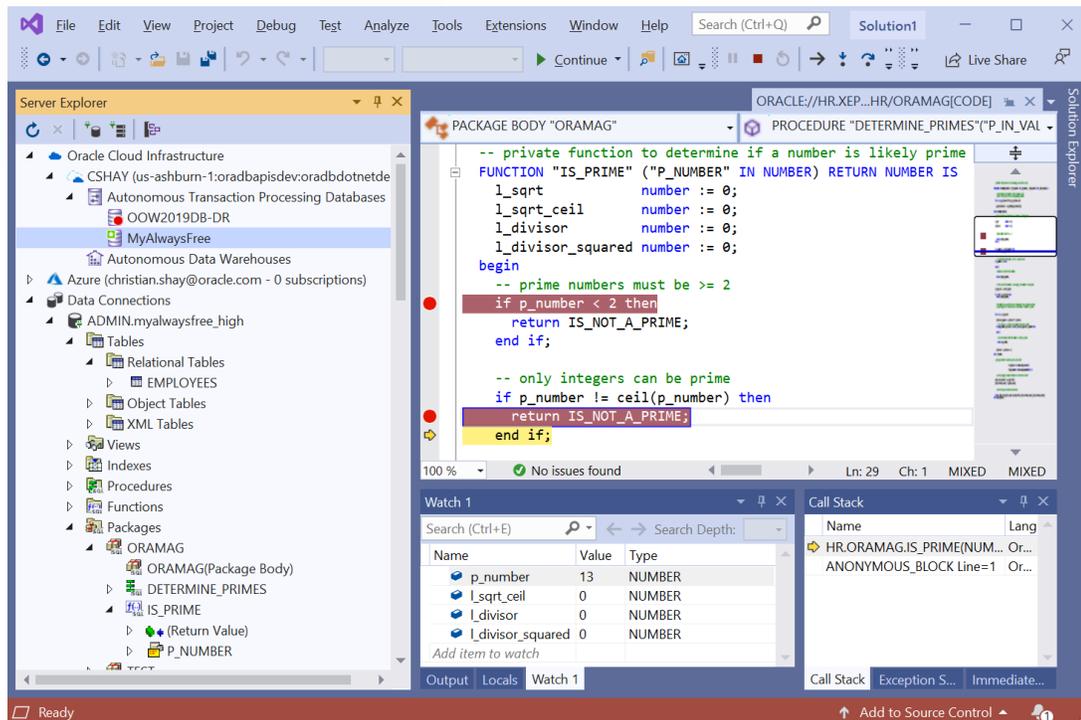


Figure1. Browsing and managing Oracle Autonomous Database (left) and editing and debugging PL/SQL (right) are just two examples of Oracle's tight Visual Studio integration.

## 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 and .NET Core features. ODP.NET developers can take advantage of Oracle's unique database functionality, including Application Continuity, Fast Connection Failover, sharding, 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; fast connection failover, and runtime load balancing. ODP.NET developers can use .NET, but not have to sacrifice powerful Oracle data management capabilities.

ODP.NET has three varieties: ODP.NET, Managed Driver; ODP.NET, Unmanaged Driver; and ODP.NET Core. ODP.NET, Managed Driver is 100% .NET code. Developers deploy a single assembly in a deployment package smaller than 10 MB. ODP.NET, Unmanaged Driver contains more features than the managed driver since it can access functionality built into the Oracle Database Client. Both these drivers support .NET Framework and Entity Framework.

The third driver is ODP.NET Core, which is designed for multi-platform .NET Core applications, but can support .NET Framework as well. ODP.NET Core functionality is similar to managed ODP.NET and it also supports Entity Framework Core.

For more information, visit [ODP.NET website](#).

## 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 website](#).

## .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 website](#).

## NEW FEATURES

### ODP.NET Entity Framework Core

ODAC 19c introduces a new provider: ODP.NET Entity Framework Core (EF Core).

### New 19c Features

- ODP.NET Entity Framework Core on Linux and Windows
- Visual Studio 2019 Support
- Autonomous Database Integration in Visual Studio
- .NET Framework 4.8
- ODP.NET Core LDAP
- Easy Connect Plus

Entity Framework Core is a cross-platform Microsoft object-relational mapper that enables .NET developers to work with relational databases using .NET objects. It also supports Language-Integrated Query (LINQ) to be able to query these objects using C#, which then is translated into native Oracle SQL by the ODP.NET EF Core provider.

ODP.NET EF Core supports mapping, querying, and using these .NET objects with Oracle database schema objects. It supports Code First and Reverse Engineering/Scaffolding scenarios. Custom data type mapping between .NET and Oracle database occurs via Data Annotations or Fluent API.

ODP.NET EF Core uses ODP.NET Core as its data provider and supports EF Core version 2.

### **Oracle Developer Tools for Visual Studio 2019**

Oracle Developer Tools for Visual Studio now supports Visual Studio 2019 including Community, Professional and Enterprise Editions. ODT for VS 2019 is available on Oracle's website as a small footprint .VSIX file for simplified installation.

### **Oracle Developer Tools For Visual Studio – Autonomous Database Integration**

ODT includes Oracle Cloud Explorer which allows developers to connect, browse and manage Autonomous Database (ADB) resources easily and intuitively. Developers can quickly create Always Free ADB instances, automatically download credentials files and be connected to the database to work on their code within minutes. All ADB features are supported, including Autonomous Database Dedicated and Autonomous Data Warehouse.

From Oracle Cloud Explorer developers can:

- Sign up for Oracle Cloud
- Quickly connect to a cloud account using a simple auto-generated config file and key file
- Create new or clone existing Always Free ADB, Autonomous Database Dedicated and Autonomous Data Warehouse instances
- Automatically download credentials files (including wallets) and quickly connect, browse, and operate on Autonomous Database schemas
- Easily change compartments and regions without reconnecting
- Start, stop or terminate ADB instances
- Scale up/down ADB resources
- Restore from backup
- Update instance credentials, update license type used
- Rotate wallets
- Convert Always Free ADB instances into paid instances
- One click connection to a service web console

### **.NET Core 3**

ODP.NET Core 19.5 is certified with .NET Core 3.

### **.NET Framework 4.8**

ODP.NET Core, Managed, and Unmanaged Drivers 19c are certified with .NET Framework 4.8.

### **Easy Connect Plus**

Oracle Easy Connect Plus provides a simple way to configure TCP/IP connections to the Oracle Database without having to use parameter files, such as tnsnames.ora, nor environment variables. Easy Connect Plus includes support for:

- TCP/IP with SSL/TLS
- Any SQL\*Net description level parameter can be used
- Multiple hosts and ports
- A straightforward name-value pair format

Easy Connect Plus supports more configurations and a wider breadth of ODP.NET applications than traditional Easy Connect, including clustered or cloud databases.

### **ODP.NET Core Lightweight Directory Access Protocol (LDAP)**

ODP.NET Core can use connect identifiers mapped to connect descriptors in an LDAP-compliant directory server, such as Oracle Internet Directory and Microsoft Active Directory. The provider supports the same LDAP features and settings as managed ODP.NET.

ODP.NET Core LDAP support is available on Windows operating systems only. It requires the System.DirectoryServices namespace.

## **CONNECT WITH US**

Call +1.800.ORACLE1 or visit [oracle.com](http://oracle.com).

Outside North America, find your local office at [oracle.com/contact](http://oracle.com/contact).

 [otn.oracle.com/dotnet](http://otn.oracle.com/dotnet)

 [youtube.com/oracledotnetteam](http://youtube.com/oracledotnetteam)

 [twitter.com/oracledotnet](http://twitter.com/oracledotnet)

Copyright © 2020, Oracle and/or its affiliates. All rights reserved. This document is provided for information purposes only, and the contents hereof are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document, and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group. 0120