What’s New for Oracle and .NET

Alex Keh
Senior Principal Product Manager
Server Technologies
Program Agenda

1. Planned ODAC Release
2. Entity Framework – New Beta Features
3. NuGet – Planned Beta Feature
4. ODP.NET, Managed Driver – New Beta Features
5. .NET 4.5.2 – New Beta Features
Program Agenda

6 High Availability
7 Schema Compare
8 Oracle Multitenant
Planned ODAC Release
ODAC 12c
Release 3 Beta
Free OTN download now available
ODAC 12c Release 3 Beta

Features

• Entity Framework 6
  – Code First
  – Code First Migrations

• ODP.NET, Managed Driver support for XML DB

• NuGet install – Coming soon

• .NET Framework 4.5.2
  – Distributed transactions – Oracle.ManagedDataAccessDTC.dll no longer needed

• And more
Entity Framework
New Beta Features
Entity Framework – Beta

New Features for Managed and Unmanaged

• Entity Framework 6 certification
  – Integrated with Visual Studio tools (e.g. EDM wizard) and ODP.NET

• Code First
  – Convention
  – Configuration
    • DataAnnotations
    • Fluent API

• Code First Migrations
Entity Framework
Code First
Entity Framework 6 Changes

Oracle-specific changes

• New assemblies
  – Beta version: 6.121.1.0
  – Follows recommended EF provider model and clean separation with EF 5

• Boolean and Byte default data type mapping has changed
  – 1. .NET Boolean maps to Oracle Number(1,0) and vice-versa
  – 2. .NET Byte maps to Oracle Number(2,0) and Number(3,0) and vice-versa
  – For EF 5 and earlier, these Oracle Numbers map to Int16
    • Can retain old behavior via customized data mapping
Entity Framework 6 Changes

Oracle-specific changes

• .NET config custom type mapping has changed
  – New version for EF 6 – Changes in red

```xml
<oracle.manageddataaccess.client>
  <version number="*">
    <edmMappings>
      <edmNumberMapping>
        <add NETType="bool" MinPrecision="1" MaxPrecision="1" DBType="Number" />
        <add NETType="byte" MinPrecision="2" MaxPrecision="3" DBType="Number" />
        <add NETType="int16" MinPrecision="4" MaxPrecision="5" DBType="Number" />
      </edmNumberMapping>
    </edmMappings>
  </version>
</oracle.manageddataaccess.client>
```
Entity Framework 6 Changes

Oracle-specific changes

• Custom mapping changes
  – DBType: Oracle Database data type
  – NETType: .NET data type that the Oracle data type maps to
  – MinPrecision: The minimum range the Oracle data type will map to the .NET type
  – MaxPrecision: The maximum range the Oracle data type will map to the .NET type

• Modified .NET config file element for unmanaged ODP.NET
  – New for EF 6: <oracle.unmanageddataaccess.client>
  – For all other apps: <oracle.dataaccess.client>
Entity Framework
New in ODAC 12c

• All DB versions
  – Implicit RC automatic metadata generation by ODT
  – Boolean data type

• Oracle DB 12c server
  – Identity column
  – SQL “APPLY” keyword for lateral views
NuGet
Planned Beta Feature
NuGet

Features and ODAC Package

• .NET software package manager
  – Makes it easier to find, install, configure, deploy, and uninstall assemblies and their dependencies cleanly

• ODAC support – Beta
  – ODP.NET, Managed Driver
  – ODP.NET, Managed Driver for Entity Framework 6 and Code First

• Considering NuGet for additional ODAC assemblies
NuGet

Availability

• Plan to make beta downloadable on OTN
• Hosting choices
  – Internally on intranet
  – Externally
    • i.e. nuget.org
NuGet
Install Changes in ODAC 12c Release 3

Non-Machine-Wide Configuration Install – Beta

• All ODAC installs provide machine-wide install option
  – Machine-wide (default)
    • Same as previous ODAC install behavior
    • Places ODP.NET in GAC
    • Update machine.config with configuration section handler and DbProviderFactory information
  – Non-machine-wide
    • None of the machine-wide actions
    • Existing apps will NOT use the newly installed version automatically
    • Preferred for ODP.NET NuGet users
      – Later ODP.NET versions configured machine-wide will not override NuGet-installed ODP.NET

• Oracle Developer Tools for Visual Studio work with either setting
ODP.NET, Managed Driver
New Beta Features
ODP.NET, Managed Driver

New Features

• XML DB - Beta
  – ODP.NET XML DB classes supported

• .NET 4.5.2 - Beta

• VARCHAR2, NVARCHAR2, and RAW up to 32 KB in size
  – Requires Oracle Database 12c or higher
  – No code changes needed

• Return row count per array DML iteration
  – ODP.NET returns number of rows affected for each input value, not just the total number of rows affected
.NET Framework 4.5.2

New Beta Features
.NET Framework 4.5.2

New Features for Managed and Unmanaged

• Certification – Beta
  – ODP.NET
  – Oracle Developer Tools for Visual Studio

• Distributed transactions – Beta
  – Oracle.ManagedDataAccessDTC.dll no longer necessary to deploy
  – Oracle and Microsoft jointly developed this solution together
High Availability
ODP.NET FAN Uses ONS

• Oracle Notification Service (ONS) replaces AQ

• Benefits
  – Faster, more scalable, eliminates firewall issue, supports Active Data Guard, and consolidates publish/subscribe service

• No code changes required
  – But configuration changes required

• Managed and unmanaged ODP.NET 12c always uses ONS
  • Except unmanaged with Oracle DB 11.2 or earlier
Faster and More Graceful Planned Outage

• Offline DB alerts ODP.NET of impending downtime
• ODP.NET stops allocating and closes idle connections
  – Connections returned to the pool are closed
• Benefit
  – DB brought offline as quickly as possible without end user disruptions
• Set ODP.NET attribute “HA Events = true”
• Recommend using Oracle Database 11.2.0.4+ and ODP.NET 11.2.0.4+
Transaction Guard

• ODP.NET can determine whether a transaction committed even upon a DB failure without custom coding

• Benefit
  – Ensures accurate knowledge of transaction outcome

• App can query transaction outcome
  – OracleConnection properties return transaction ID and status
  – OracleLogicalTransaction class

• Requires Oracle Database 12c and ODP.NET 12c
Transaction Guard Scenario

1. ODP.NET receives FAN down event or error

2. IsRecoverable=false → roll back
   IsRecoverable=true → re-submit

3. New for 12.1.0.2 – To re-submit, retrieve OracleConnection.OracleLogicalTransaction


5. If committed and completed, done.
   If not committed nor completed, re-submit.
Global Data Services

• Extend RAC services to a global basis
  – Access to FCF, load balancing, and affinity capabilities
  – RAC, Active Data Guard, and GoldenGate can participate

• Benefit
  – Optimizes utilization, HA, and performance

• ODP.NET connection pool enhanced for GDS
  – No code changes required

• Requires Oracle Database 12c and ODP.NET 12c
Schema Compare
Schema Compare Tool in Visual Studio

• New in Oracle Developer Tools for Visual Studio
  – ODAC 12c
  – Oracle Database 10.2 or higher

• Compare two schemas in the same or different DBs
  – Visually inspect differences using UI
  – Generate a diff script for deployment purposes
  – Reverse schema compare to “rollback” changes
  – Can compare down to granularity of schema type
    • e.g. compare all tables, or all packages, etc.
Schema Compare
Typical Visual Studio Developer Use Case

• 1. Development schema identical to production schema
• 2. Development schema evolves to meet needs of app
• 3. Use Schema Compare to inspect what has changed
• 4. Use Schema Compare to generate diff script
• 5. Deploy diff script with app
Schema Compare
View Differences Via Tree Control

Object | Compare Status
--- | ---
DEVELOPMENT.ORCL -> PRODUCTION.ORCL | Different
Schemas | Different
DEVELOPMENT -> PRODUCTION | Different
Tables | Different
Relational | Different
DEPARTMENTS | Identical
EMPLOYEES | Identical
JOB_HISTORY | Different
JOBS | Identical
Views | Identical
Procedures | Different

Object | Compare Status
--- | ---
JOB_HISTORY | Different
EMPLOYEE_ID | Identical
START_DATE | Identical
END_DATE | Identical
JOB_ID | Identical
DEPARTMENT_ID | Identical
BIRTHDAY | Only in Source
Constraints | Identical
JOBS | Identical
Oracle Multitenant
Multitenant Architecture

Components of a Multitenant Container Database (CDB)

Pluggable Databases (PDBs)

PDBs

Root

CDB
Multitenant for Test and Development
Clone Test system, plug into Development. Clone/destroy test instances
Multitenant is great for developers

• Very rapid cloning and creating database
  – About as long as copying the database files (minutes)
  – Using DBCA to create a database takes a long time

• Rapid sharing with other devs for testing
  – Unplugged PDBs are an XML file and several DBF files
  – Zip these up and share with other developers who can plug them in and be using them in minutes
Oracle Multitenant and Visual Studio
Oracle Multitenant with ODP.NET

• ODP.NET works implicitly with PDBs
  – Connect to the PDB service name
  – Hostname and port are same as container

• Requires Oracle Database 12c and ODAC 12c
Additional Oracle .NET Resources

OTN
otn.oracle.com/dotnet

Twitter
twitter.com/OracleDOTNET

YouTube
youtube.com/OracleDOTNETTeam

Email
alex.keh@oracle.com
Oracle .NET Customer Advisory Board

• Focus group that provides Oracle input and help to prioritize new features
  – Led by Oracle VP

• Work directly with Oracle Development and PM

• Best for organizations in which Oracle .NET is strategic

• Contact me for details and how to apply
Upcoming .NET Sessions

• Getting Started with Oracle and .NET
  – Tuesday - 12:00 PM - 12:45 PM Moscone North - 131

• ALM with Visual Studio: SQL and PL/SQL Development, Source Control, and Deployment
  – Tuesday - 5:00 PM - 5:45 PM Moscone South - 309

• Meet the Experts: .NET Development for Oracle Database
  – Tuesday - 7:00 PM - 7:45 PM Moscone South - 307

• Oracle and .NET: Best Practices for Performance and Deployment
  – Thursday - 9:30 AM - 10:15 AM Moscone South - 308
Upcoming .NET Sessions

• PL/SQL Programming for .NET Developers: Tips, Tricks, and Debugging
  – Thursday - 1:15 PM - 2:00 PM Moscone South – 308
Visit .NET Experts at the Demogrounds

- .NET Development for Oracle Database 12c
  - Monday through Wednesday
  - Moscone South Exhibition Hall, Far Left Middle in Oracle Database Section
  - Booth SLD-169
Questions and Answers
Safe Harbor Statement

The preceding is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle’s products remains at the sole discretion of Oracle.
Hardware and Software
Engineered to Work Together