What’s New for Oracle and .NET

Part 1

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Server Technologies
Oracle
Program Agenda – Day 1

1. ODAC Releases
2. NuGet
3. Entity Framework
4. Schema Compare
Program Agenda – Day 2

5 ODP.NET, Managed Driver
6 Ease of ODP.NET Development and Migration
7 High Availability
8 Oracle Multitenant
ODAC Releases
ODAC 12c Release 3 in Production

Free OTN download now available
Oracle’s Commitment to .NET

- ODP .NET
- ODT & .NET SP
- ODAC 2006
- 64-bit ODAC
- ODAC 2008
- ODAC 2009
- ODAC 11.2 R2
- ODAC 11.2 R4
- ODAC 11.2 R5
- ODAC 12c R1 & R2

2002-03: .NET 1.0
2005: .NET 2.0
2006: .NET 3.0
2007: .NET 3.5
2007-08: .NET 4
2009: EF
2010: .NET 4.5
2011: Managed ODP
2012: VS 2013
2013: VS 2013
NuGet
NuGet

Features and ODAC Package

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

• First ODAC components supported
  – ODP.NET, Managed Driver
  – ODP.NET, Managed Driver for Entity Framework 6 and Code First
NuGet

Availability

• Very soon
  – Will be announced on OTN, Twitter, and newsletter

• Installation choices
  – Internet
    • nuget.org
  – Intranet
    • Corporate-hosted NuGet feed
  – Local machine
NuGet
NuGet

Install Instructions

1. Open NuGet Package Manager from Visual Studio project
2. Select nuget.org and search for ODP.NET package
   - Choose official ODP.NET version
   - ODP.NET EF provider will automatically include ODP.NET and EF as dependencies
3. Click Install button and accept license
   - Note: OUI-installed ODP.NET versions won’t override NuGet-installed ODP.NET
     • NuGet install auto-configures assembly version redirect
4. Open app/web.config to configure connection string and Oracle connect descriptor
Entity Framework

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
  – Version: 6.121.2.0
  – 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: minimum range Oracle data type will map to .NET type
  – MaxPrecision: maximum range Oracle data type will map to .NET type
Entity Framework Migration

EF 5 to EF 6

• 1. Uninstall EF 5 in Package Manager Console
• 2. Install EF 6 in Package Manager Console
• 3. Delete the following namespaces from your application
   – using System.Data.EntityClient;
   – using System.Data.Objects;
• 4. Add the following namespaces to your application
Entity Framework Migration
EF 5 to EF 6

5. Add Oracle EF 6 configuration to the .NET config in "providers" section
   – Automatically handled by NuGet

   – Automatically handled by NuGet

7. Modify Oracle to .NET data type mappings (if applicable)
   – Default behavior has changed for Boolean and Byte
Entity Framework
New in ODAC 12c

• All DB versions
  – Implicit RC automatic metadata generation by ODT
    • No more manual metadata entry
  – Boolean data type
  – ODP.NET, Managed Driver

• Oracle DB 12c server
  – Identity column
  – SQL “APPLY” keyword for lateral views
Entity Framework - Implicit RC

• RC metadata can be automatically generated specifically for EF implicit result sets

• Steps
  – 1. While in EF project, run stored procedure in Server Explorer
  – 2. Check off “Select for Config” box(es)
  – 3. Click “Add to Config” button

• Benefit
  – Eliminates hand-coding metadata
EF: RC Metadata Auto Generation
Schema Compare
Schema Compare Tool in Visual Studio

• New in Oracle Developer Tools for Visual Studio
  – ODAC 12c – Download 32-bit “ODTwithODAC”
  – 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
Launch from Server Explorer
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

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Schema Compare
View Differences
Schema Compare
View Differences in PL/SQL too

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Object Definition</th>
<th>Update SQL</th>
</tr>
</thead>
</table>

**Source:**

```sql
CREATE OR REPLACE PROCEDURE add_job_history
(p_emp_idjob_history.employee_idKType,
p_start_datejob_history.start_dateKType,
p_end_datejob_history.end_dateKType,
p_job_idjob_history.job_idKType,
p_department_idjob_history.department_idKType,
p_h_birthdayjob_history.h_birthdayKType)

IS
BEGIN
INSERT INTO job_history (employee_id, start_date, end_date,
job_id, department_id, birthday)
VALUES(p_emp_id, p_start_date, p_end_date, p_job_id, p_department_id, p_h_birthday);
END add_job_history;
```

**Target:**

```sql
CREATE OR REPLACE PROCEDURE add_job_history
(p_emp_idjob_history.employee_idKType,
p_start_datejob_history.start_dateKType,
p_end_datejob_history.end_dateKType,
p_job_idjob_history.job_idKType,
p_department_idjob_history.department_idKType)

IS
BEGIN
INSERT INTO job_history (employee_id, start_date, end_date,
job_id, department_id)
VALUES(p_emp_id, p_start_date, p_end_date, p_job_id, p_department_id);
END add_job_history;
```
Schema Compare
Create Diff Scripts

--- ***** Deploy Script, Script Date: 5/5/2014 10:59:49 AM *****

@\..\Tables\DEVELOPMENT.JOB_HISTORY.sql
@\..\Procedures\DEVELOPMENT.ADD_JOB_HISTORY.sql

--- ***** Object: Table DEVELOPMENT.JOB_HISTORY
ALTER TABLE "JOB_HISTORY" ADD ("BIRTHDAY" DATE);
Schema Compare
Run Diff Script against Target to make it the same as Source
New features in Oracle Developer Tools
ODAC 12.1 Release 3

• Schema Compare now supports XMLType Table and XMLType Views, Index Organized Tables, and Bitmap join indexes
• Option to enable/disable schema name usage in script generation
• Generate Create Script menu item on Data Connection Node
• Option to limit number of objects displayed under a Server Explorer collection node (for better performance)
Additional Oracle .NET Resources

OTN
otn.oracle.com/dotnet

Twitter
twitter.com/OracleDOTNET

YouTube
youtube.com/OracleDOTNETTeam

Email
alex.keh@oracle.com
Questions and Answers
Safe Harbor Statement

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