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# ORACLE DEVELOPERS

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## What's New for .NET Developers for Oracle Database

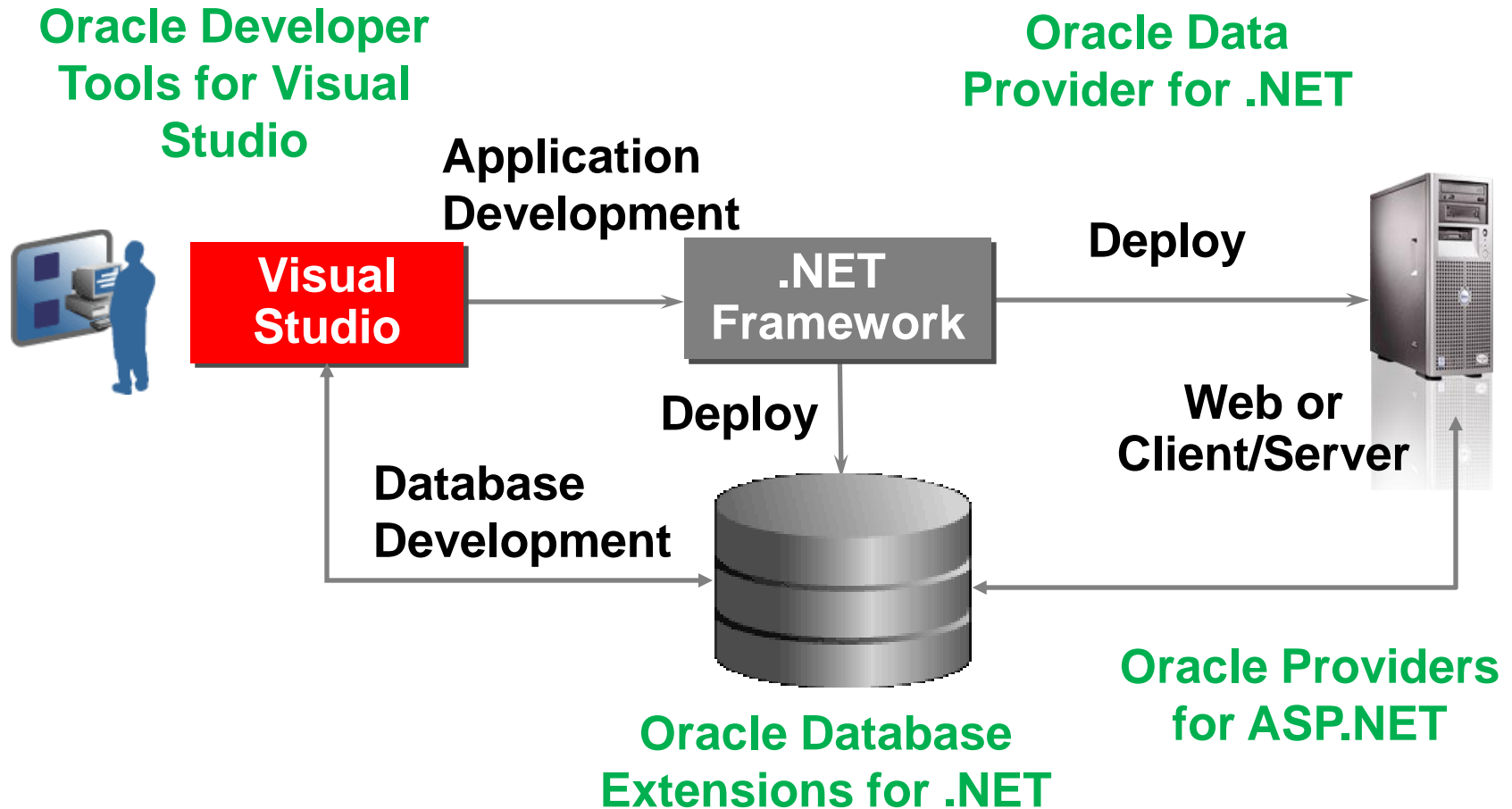
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Principal Product Manager, Oracle

# Program Agenda

- Currently available
  - Visual Studio 2010 and .NET Framework 4
  - ODAC 11.2 features
  - Oracle OLAP
- Future directions
  - Entity Framework and LINQ
  - Fully managed ODP.NET
  - TimesTen
- Fusion Middleware
  - Coherence



# Oracle .NET Development Environment







# Visual Studio 2010 and .NET Framework 4

# Visual Studio 2010 and .NET Framework 4

- ODAC 11.2.0.1.2 supports Visual Studio 2010 and .NET Framework 4
  - Including ODP.NET, ODT, ASP.NET providers, and ODE
  - Free OTN download
- Key ODAC 11.2.0.1.2 features
  - Supports Client Profile and full .NET Framework
  - 32-bit ODAC now on OTN
    - OUI and xcopy
  - 64-bit support
    - OUI install available with Oracle patchset 11.2.0.2
    - Xcopy on OTN soon after Oracle patchset 11.2.0.2



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# Visual Studio 2010 and .NET 4



# ODAC 11.2 Features



# Oracle .NET Application Performance – Optimization Steps

- .NET data access tuning
  - Use ODP.NET best practices
- SQL tuning
  - Use SQL Tuning Advisor in Visual Studio
- Database tuning under real world conditions
  - Oracle Performance Analyzer in Visual Studio detects issues you have missed
  - May need to modify application based on findings
  - Can be used during testing phase or production

# ODP.NET Performance – What's New

- Self-Tuning
  - Automatically optimizes statement cache size at run time
- Faster Data Retrieval
  - For DataSet and OracleDataReader
- Reduced Memory Usage
- No code changes necessary – just upgrade ODP.NET

# ODP.NET Self-Tuning Performance Comparison

- ODP.NET 11.1.0.7.20 vs. 11.1.0.7.0 running OLTP workload adapted from customer application
  - Faster completion (24%)
  - More throughput (60%)
  - Better response time (38%)
  - Less network traffic (21%)
  - Less CPU on both client (19%) and server (17%)
  - More transactions per second per CPU on client (99%) and server (92%)
- All gains were out of box
  - No tuning done

# ODT Performance Tuning – What's New

- SQL Tuning Advisor
  - Tune ad-hoc queries in Query Window
  - Tune inefficient application SQL detected by Oracle Performance Analyzer
- Oracle Performance Analyzer
  - Tune your running application's use of the database



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# Oracle DB Tuning using Visual Studio



# .NET Messaging – What's New

- Visual Studio Oracle database messaging tools
  - ODT – Advanced Queuing (AQ) designers
    - Create, modify, and administer your queues and queue tables
- .NET API for database integrated queue
  - ODP.NET Streams Advanced Queuing API
    - Build .NET messaging applications with Oracle's database-integrated queue

# Oracle Edition-Based Redefinition

- Upgrade **DB component of an app** even when app in use
  - Minimizes or eliminates downtime for the application
- Typical usage scenario
  - Copy the app's DB objects to redefine copied objects in isolation
  - Existing users continue to run the unchanged app
  - When done testing new objects, upgraded app can be made available to all users
- Not upgrading the actual DB version, but the app version running in the DB
- ODP.NET can set an edition at deployment time for each .NET process
  - Set edition in Windows Registry or .NET config

# ODP.NET – What's New

- Promotable Transactions
  - Promote local transactions to distributed during run time
  - Requires Oracle Database 11g and OraMTS 11.1.0.7.20 or higher



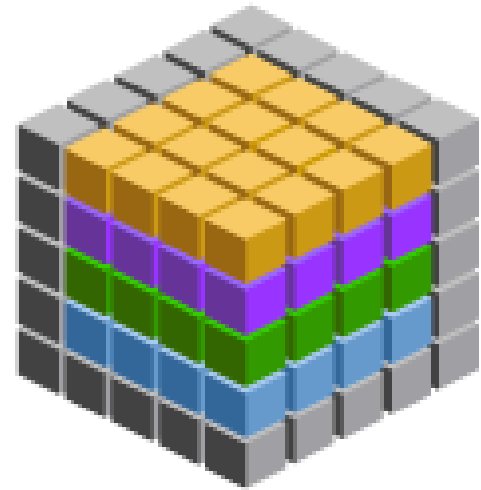
# Online Analytical Processing (OLAP)

- Query large amounts of aggregated data to analyze complex relationships
- OLAP cube consists of
  - Measures or Key Performance Indicators (e.g. total sales)
  - Dimensions (e.g. 2009, North America)
    - Arranged into hierarchies (e.g. Q1, June, USA, Canada)
- Dimensions and measures represented by a star schema
  - Basic star schema arranges dimension tables around central fact table that contains measures
  - Fact table contains a column for each measure and a column for each dimension



# Oracle OLAP Option

- **Summary management solution** for SQL based business intelligence applications
  - Alternative to table-based materialized views, offering improved query performance and fast, incremental update
- **Full featured** multidimensional OLAP server
  - Excellent query performance for ad-hoc/unpredictable query
  - Enhances the analytic content of business intelligence application
  - Fast, incremental updates of data sets



# Oracle OLAP Option

- **Embedded** OLAP solution
  - Runs within Oracle Database Enterprise Edition
- **Open** solution
  - Query using SQL, PL/SQL, OLAP API
- **Secure** solution
  - Oracle users are OLAP users
- Excellent **performance** for unpredictable query patterns
  - Appropriate for both static and exploratory reporting
  - Advantages increase as reporting becomes more exploratory

# Oracle OLAP for the .NET Developer

- Use ODT to design OLAP applications
  - View OLAP tables, views, and materialized views
  - OLAP queries via Oracle Query Window or Microsoft Query Window
    - Build OLAP queries graphically via the Microsoft Query Window
- Use ODP.NET to build OLAP applications
  - Query OLAP using SQL or PL/SQL
- Use Microsoft Office to build OLAP applications
- Design OLAP cubes using Oracle Analytic Workspace Manager



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## Oracle OLAP and .NET

# Oracle OLAP Advantages for .NET Developers

- No MDX needed
  - Use SQL with Oracle OLAP
- Cut maintenance costs
  - Oracle OLAP does not require a separate data store
- As your OLAP cube grows
  - Use RAC to maintain scalability and performance (and HA)
- Active Data Guard takes advantage of underutilized servers
- Materialized views
  - Enhances summary query performance against detail tables
- Secure OLAP data
  - Oracle database has numerous security features (e.g. VPD, fine-grained access control)



# Entity Framework and LINQ

# ADO.NET Entity Framework

- Object-relational mapping (ORM) for .NET
  - Abstracts the logical (relational) database schema
  - Presents schema in an application-specific conceptual schema
  - Eliminates object-relational impedance mismatch
- Data source providers abstract DB interfaces when programming against conceptual model
- Entity data model (EDM) – conceptual data model that maps to the relational model
- EDM Wizard and Designer
  - Generating and modifying DB and conceptual schema mapping
- Entities represent the individual object instances
  - E.g. employees, sales orders

# Querying and Modifying Entities

- Query entities via alternative language to SQL
- LINQ to Entities
  - Language-Integrated Query (LINQ)
  - Query language integrated into .NET
  - E.g. “from e in ctx.EMPes select e”
- Entity SQL
  - SQL variant for declarative queries and updates over entities and their relationships
  - E.g. “select value e from Entities.EMPes as e”
- No language-specific DML
  - DML done programmatically

# Oracle Support for LINQ and Entity Framework

- Entity Data Model Wizard and Designer
  - Generate a conceptual model from Oracle Database
  - Update conceptual model, storage model, and mappings from Oracle Database
  - Generate Oracle SQL DDL script from the conceptual model
- Query language interfaces
  - LINQ to Entities
  - Entity SQL
  - DML capabilities (insert/update/delete)
    - Entity Framework auto-generates DML statements for Oracle Database
    - Or use your own Oracle stored procedures for DML



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# **Entity Framework and LINQ**



# Oracle Support for LINQ and Entity Framework

- Will require .NET Framework 4 and Visual Studio 2010
- Time frame
  - Beta: around end of 2010
  - Production: 2011
- Subscribe to the OTN .NET Newsletter
  - Newsletter will announce feature availability
  - <http://www.oracle.com/technetwork/topics/dotnet/maillist-096598.html>

# NHibernate

- Open source ORM for .NET
  - Free
  - Popular
  - Mature
- Maps .NET classes to database tables
- Maps CLR data types to SQL data types
- NHibernate website and software download
  - <http://nhforge.org/>

# NHibernate and ODP.NET

- Use ODP.NET for NHibernate access to Oracle DB
- Key settings
  - Set *connection.driver\_class* property to *NHibernate.Driver.OracleDataClientDriver*
  - Set *dialect* property to *NHibernate.Dialect.Oracle10gDialect*

# Fully Managed ODP.NET

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# Fully Managed ODP.NET

- 100% managed provider
  - Including Oracle Client
- Fully ADO.NET compliant
- Release schedule
  - Beta – 2011
  - Production – End of 2011





TimesTen

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# Oracle TimesTen In-Memory Database

- Memory-optimized relational database
  - Data set fit entirely in physical memory
- Provides instant responsiveness and very high throughput required by real-time applications
- Deployed in the application tier as an embedded or standalone DB
- Access via standard SQL
- Can be used as an in-memory database cache

# Oracle TimesTen Data Provider for .NET

- Fast .NET data access to TimesTen
- Supports ODP.NET classes, enumerations, interfaces, delegates and structures
- Available with Oracle patchset 11.2.0.2
  - ODP.NET xcopy (32-bit and x64) on OTN soon afterwards
- Requirements
  - 32-bit Windows and Windows x64
  - .NET Frameworks 2.0, 3.0, 3.5, and 4
  - Microsoft Visual Studio 2005 or later
  - TimesTen release 11.2.1.6.1 or later





# Oracle Coherence

- In-memory mid-tier distributed data grid
- Automatically partitions data in memory across multiple servers
  - High availability and transaction integrity even if a server fails
  - Automatically redistributes load when machines added or removed from cluster
- Fusion Middleware component
- New Oracle Coherence 3.6 features
  - ASP.NET Session State Provider
  - End-to-end Secure Sockets Layer (SSL) connectivity
  - Transaction Framework for distributed transactions
  - Coherence Quorum
  - Coherence Query Language

# Oracle Coherence Session State Provider

- Alternative data store for session state
- Available with Oracle Coherence 3.6
  - Session provider for Microsoft .NET
- When to use
  - High performance retrievals and writes
  - HA and scalability requirements

# Appendix



## More Oracle .NET Resources

- .NET Technology Center
  - <http://www.oracle.com/technetwork/topics/dotnet/>
- For more questions
  - [alex.keh@oracle.com](mailto:alex.keh@oracle.com)
  - [christian.shay@oracle.com](mailto:christian.shay@oracle.com)


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