DevDays
2008
Bring your ideas to life
ADO.NET ENTITY FRAMEWORK

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Entity Framework – Key Facts

• **Extension to the ADO.NET Provider Model**
  – Pluggable to support any database

• **Functionality**
  – Abstracts a model from your store schema
  – Offers Object Relational Mapping/LINQ and ADO.NET APIs

• **Status**
  – Coming in Visual Studio 2008 Sp1, Summer 2008
  – Currently in VS 2008 Sp1 Beta 1
    • 3 previous independent betas
## LINQ to SQL? LINQ to Entities?

<table>
<thead>
<tr>
<th></th>
<th>LINQ to SQL</th>
<th>LINQ to Entities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Database Support</strong></td>
<td>SQL Server</td>
<td>Many</td>
</tr>
<tr>
<td><strong>Object Relational Mapping Capabilities</strong></td>
<td>Simple</td>
<td>Complex</td>
</tr>
<tr>
<td><strong>Requires Attributed .NET Code</strong></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Released</td>
<td>Beta</td>
</tr>
</tbody>
</table>
DEMO
Programming Entity Framework with LINQ
Key Classes

- Connection
- Metadata
- State Management
- CRUD

Provider

- CSDL
- MSL
- SSDL

CreateQuery<T>(string entitySql, ...)

ObjectQuery<T> (Generic Class)
LINQ to Entities – Lots of Topics

- Change Tracking
- Concurrency
- Transactions
- (i)POCO
- Stored Procs
- Inheritance
- Customising Code-Gen
- Metadata
- N-Tier
- Compiled Queries
- Performance
ADO.NET Entity Framework

Entity Provider

Conceptual Model

Map

Store Model

SQL Provider

Oracle Provider

...
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Manipulating our Conceptual Model
ADO.NET Entity Framework

ADO.NET API

Entity Provider

Conceptual Model

Map

Store Model

ORM API

SQL Provider

Oracle Provider

...
DEMO
Programming with Entity SQL and ADO.NET
# EF Providers in Progress

<table>
<thead>
<tr>
<th>Vendor</th>
<th>DB Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft</td>
<td>SQL Server</td>
</tr>
<tr>
<td>Core Lab</td>
<td>Oracle, MySQL, PostgreSQL, SQLite</td>
</tr>
<tr>
<td>IBM</td>
<td>DB2, Informix Dynamic Server</td>
</tr>
<tr>
<td>MySQL AB</td>
<td>MySQL</td>
</tr>
<tr>
<td>Npgsql</td>
<td>PostgreSQL</td>
</tr>
<tr>
<td>OpenLink</td>
<td>Many via OpenLink ODBC or JDBC</td>
</tr>
<tr>
<td>Phoenix</td>
<td>SQLite</td>
</tr>
<tr>
<td>DataDirect</td>
<td>Oracle, Sybase, SQL Server, DB2</td>
</tr>
<tr>
<td>Firebird</td>
<td>Firebird</td>
</tr>
</tbody>
</table>
Resources

• **New Data Developer Site**
  - [http://www.datadeveloper.net](http://www.datadeveloper.net)

• **ADO.NET Team Blog**

• **My website 😊**
  - [http://www.miketaulty.com](http://www.miketaulty.com) (search Entity)
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Provider Specific (PL/SQL)

"SELECT * FROM CUSTOMERS"
ADO.NET Entity Framework

Conceptual Model

UKCustomer

UKPremiumCustomer

Map

Customers
Provider Agnostic (ESQL)

"SELECT * FROM UKCUSTOMER"
ADO.NET Entity Framework

Programming Model

LINQ

Object Relational Mapping

Mapping (MSL)

.NET Data Provider

Reader
Connection
Adapter
Command

Store
Programming with Entity SQL

• The EntityClient provides the usual
  – Connection, Command, DataReader
• There is no EntityDataAdapter
  – V1.0 the model is read-only
• Entity SQL has some additional constructs to expose the underlying conceptual model
DEMO
Programming with Entity SQL
Mapping Examples (1 – Splitting)

Store

<table>
<thead>
<tr>
<th>Good Customers</th>
<th>Bad Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>ID</td>
</tr>
<tr>
<td>FirstName</td>
<td>ForeName</td>
</tr>
<tr>
<td>LastName</td>
<td>Surname</td>
</tr>
</tbody>
</table>

Mapping

<table>
<thead>
<tr>
<th>CustomerId</th>
<th>First</th>
<th>Last</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Type=&quot;G&quot;</td>
</tr>
</tbody>
</table>

Entities

<table>
<thead>
<tr>
<th>Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>CustomerId</td>
</tr>
<tr>
<td>First</td>
</tr>
<tr>
<td>Last</td>
</tr>
<tr>
<td>Type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type=&quot;B&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
Mapping Examples (2 – TPH)

* Framework also supports TPT
Mapping Examples (3 – View + SPs)

Store

ClientView1

```
select c.id, c.name
from customers c
where c.country = 'UK'
```

Mapping

```
p_DeleteUkCustomer
p_UpdateUkCustomer
p_InsertUkCustomer
```

Entities

UkCustomer

<table>
<thead>
<tr>
<th>CustomerId</th>
<th>Name</th>
</tr>
</thead>
</table>

CustomerView1

```
DEMO
Querying Different Models with Entity SQL
Programming with LINQ to Entities

- **New Data Access ORM API implemented in assembly**
  - System.Data.Entity.dll

- **Many Namespaces**
  - System.Data.Entity
  - System.Data.Objects
  - ...

- **Object Relational Mapping API can be used with or without LINQ**
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Programming with LINQ to Entities