Simple.Data

… an ORM without O, R or M

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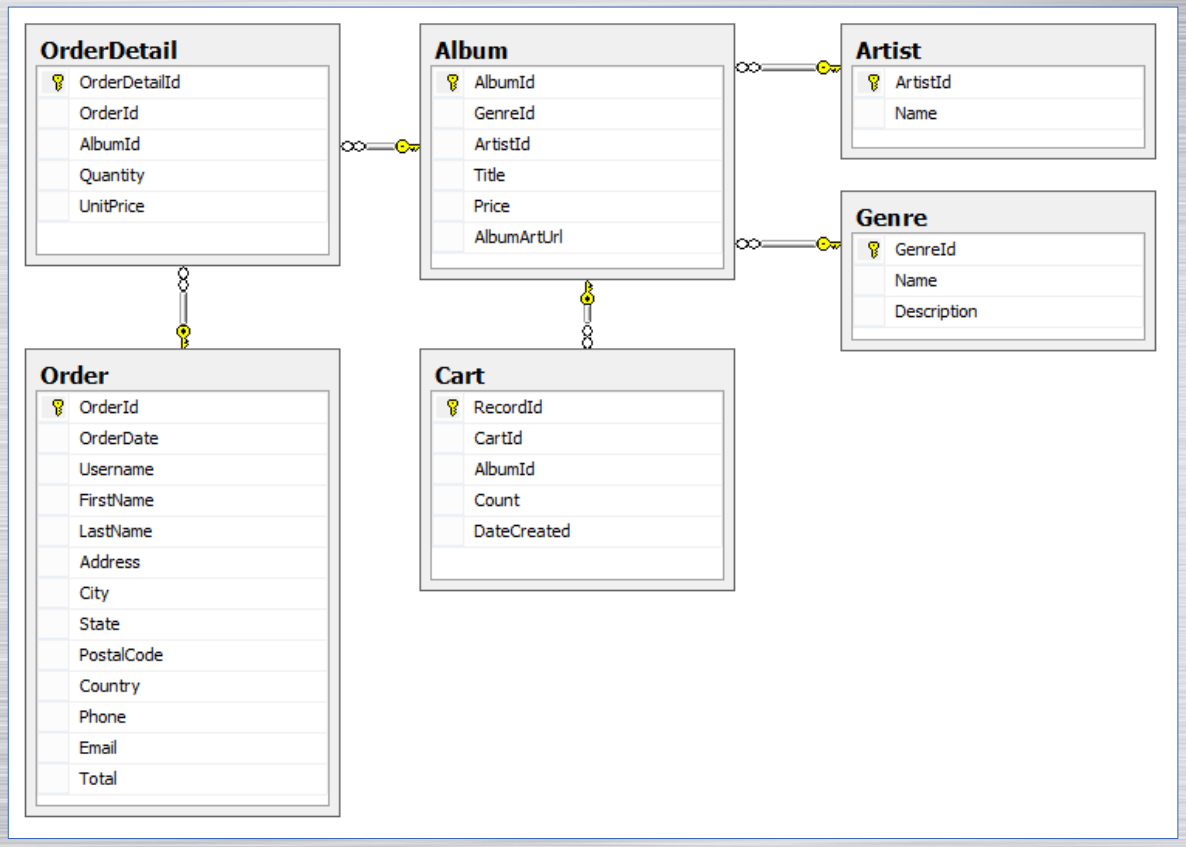
What is Simple.Data?

An O/RM without O, R or M!

Hands-on!

- SQL Server + MvcMusicStore DB
  - http://mvcmusicstore.codeplex.com/



What is Simple.Data?

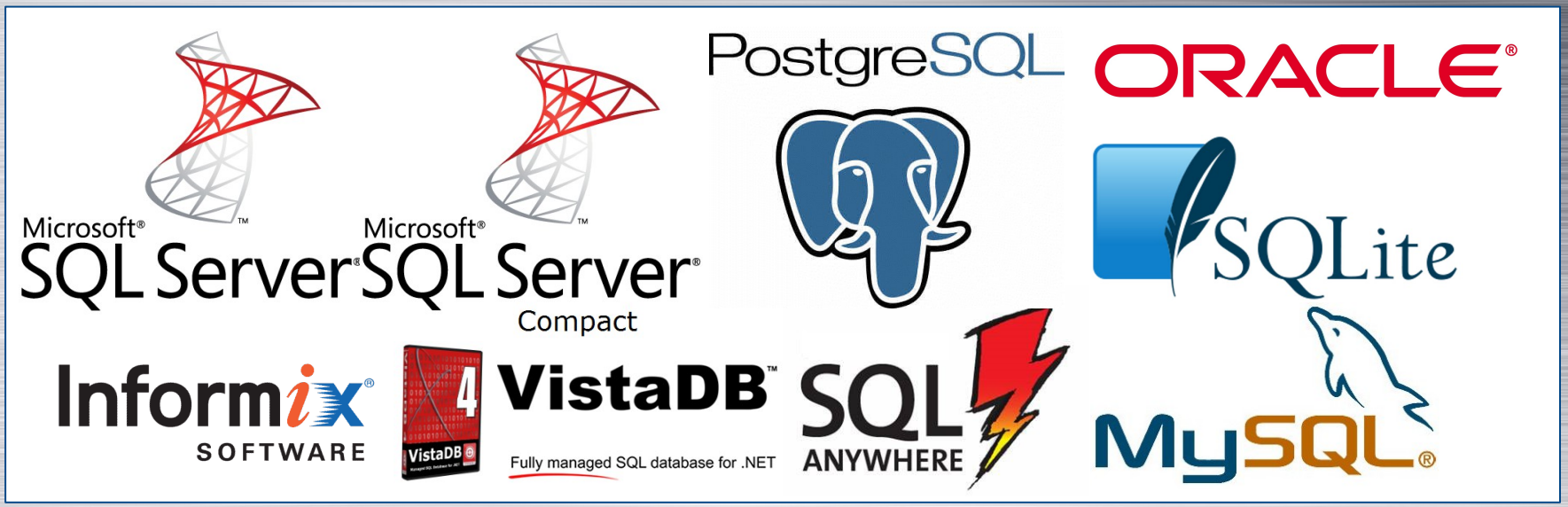
- Lightweight way of manipulating data
  - Based on .NET 4.0's „dynamic“ keyword
  - Interprets method and property names
  - Maps them to your underlying data-store
  - Prevents SQL Injection
  - Inspired by Ruby’s ActiveRecord and DataMappers
  - Open Source & runs on Mono
  - V1.0 rc3 released in Nov. 2012

The Menu

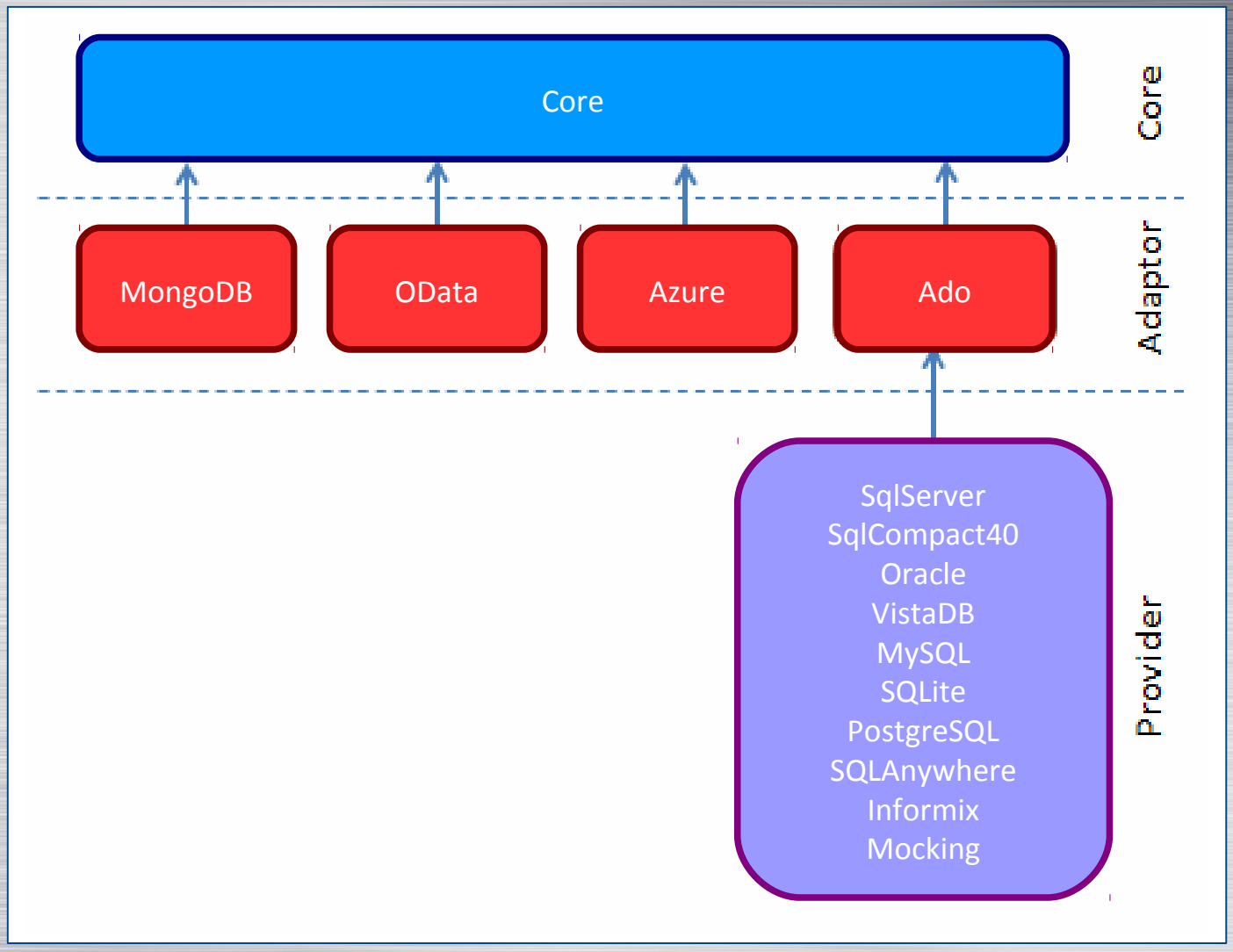
- Generalities
- Conventions
- CRUD Operations
- Objects Returned
- Joins & Evaluation Strategies
- Various Functions
- Tool & Testing
- Wrap-Up

- Hands-ons along the way

Database agnostic



Package Architecture



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Nuget Packages

```
PM> Install-Package
   Simple.Data.SqlServer
   Simple.Data.Ado
   Simple.Data.SqlCompact40
   Simple.Data.Sqlite
   Simple.Data.MongoDB
   ...
```

Conventions

Opening a Connection

```
var magicDb = Database
                .OpenConnection("ConnectString");

var fileDb = Database
                .OpenConnection("MyDB.sdf");
```

- Per default connections are aggressively opened and closed for each query
- Supports shared connections

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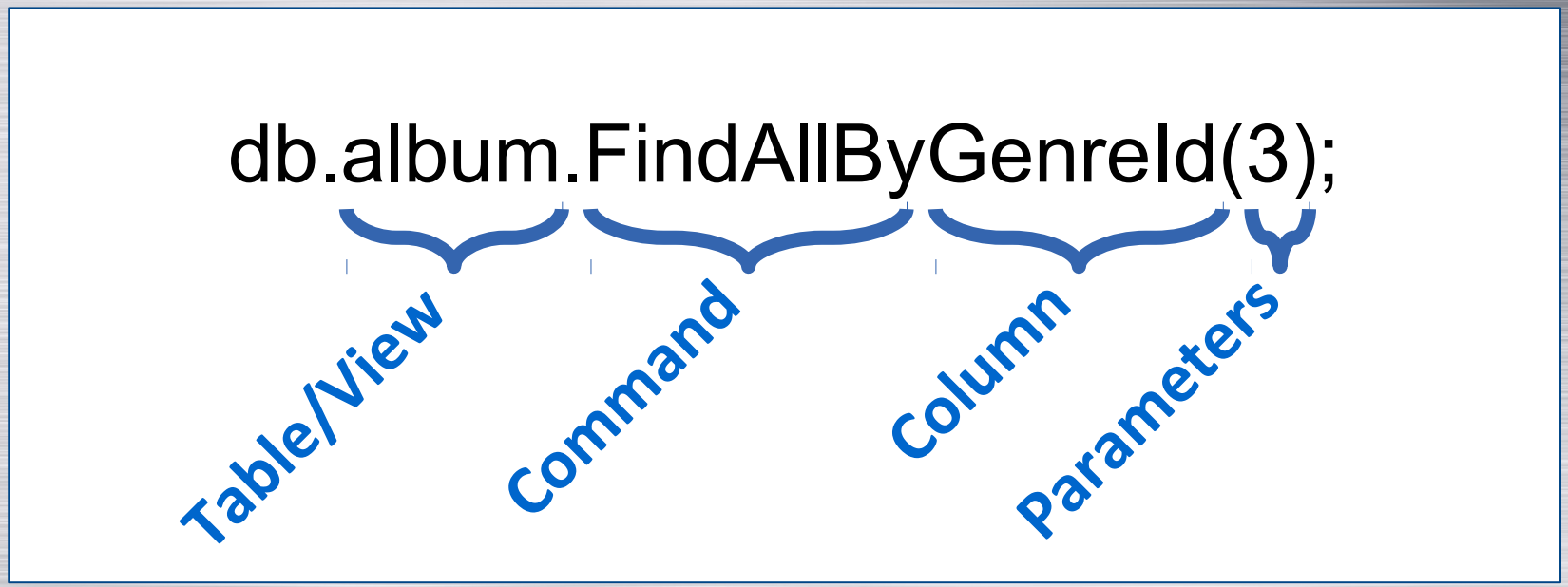
Choose your weapon

- The „Fluid“ Way
  - Methods & properties convention-based mapping
- The „Indexer“ Way
  - Identification via an indexer syntax

The Fluid Way



The Indexer Way

- The problem

```
//Find by „Candy“ or find by „C and Y“?
db.sweets.FindAllByCAndY("Oreo");
```

- The solution

```
//Full indexer way
db["sweets"].FindAllBy(Candy: "Oreo");
//Hybrid fluid + indexer
db.sweets.FindAllBy(Candy: "Oreo");
db["city"].FindAllByCityName("Paris");
```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Target Matching

- Sequence
  - Exact match
  - Case-insensitive - non-alphanumeric chars
  - Pluralized/Singularized version
- The following are thus all identical
  - Albums.GenreId
  - Album.GenreId
  - ALBUMS.GENREID
  - ALBUM.GENREID
  - [ALBUMS].[GENREID]
  - [ALBUM].[GENREID]
  - AlBuM.geNReId
  - Al__*bum.Genr-eId
  - ...

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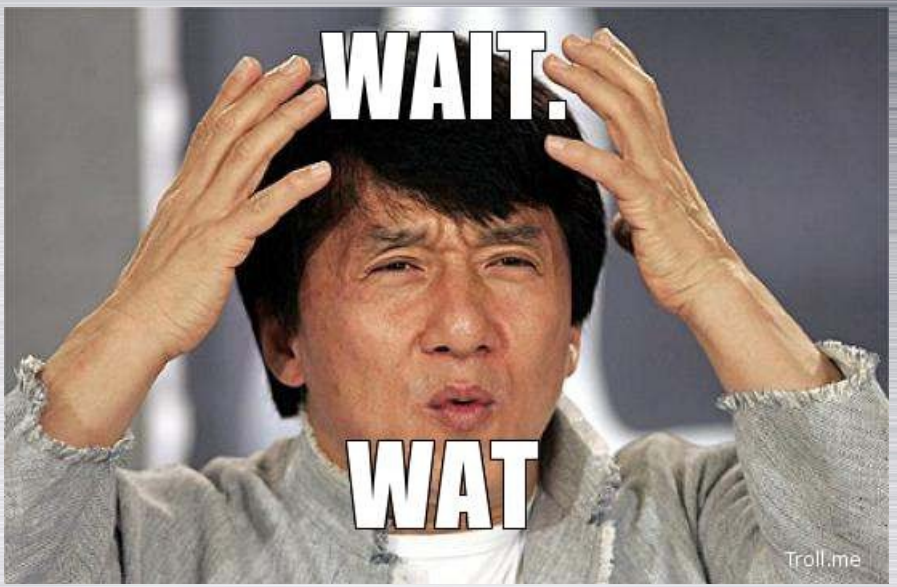
No IntelliSence



- Dynamics => no member / function inferrence
- Schema analyse planned for Simple.Data v2
- Tool: Simple.Data.Pad
- Still easy to get used to

CRUD OPERATIONS

Create

- Insert(object or named parameters)

Read

- Read
  - All()
  - Find(simple expressions)
  - Get(primary key)
  - FindAll(optional condition)
  - FindAllByXXX(parameter)

Update

- Update(object or named parameters)
  - Update
  - UpdateByXXX
  - UpdateAll + optional condition
- Upsert e.g. Update or Insert
- Some kind of optimistic locking
  - Update(modifiedObject, originalObject)
  - Fails if the column(s) you are modifying changed
    - Nota: does not work with Upsert

Delete

- Delete
  - Delete(object or named parameters)
  - DeleteByXXX(parameters)
  - DeleteAll(optional conditions)

Hands-on!

- CRUD Operations
  - Insert
  - Update
  - Delete
  - Read

Objects Returned

SimpleRecord

- Dynamic object
- Contains a property for each of the columns requested whose values are those of the single row retrieved from the data store
- „Cast-able“ to a concrete implementation

SimpleQuery

- Dynamic object
- Similar to LINQ structure
- Executes when enumerated
- Contains a SimpleRecord object for each row returned

Casting

- Casting to objects
  - Implicit
  - Explicit: Cast<T>, ToList, ToList<T>, ToArray, ToArray<T>

- Hands-On
  - Implicit casting
  - Explicit casting

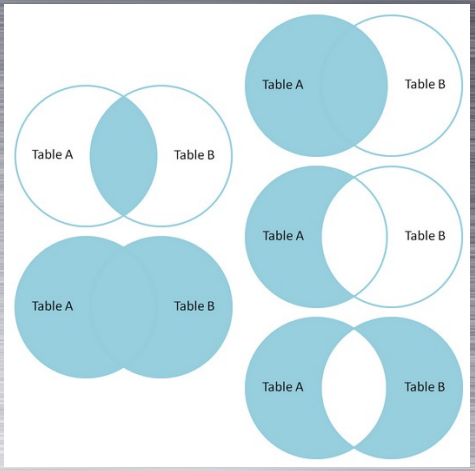
Joins

& Evaluation Strategies

Hands-on!

- Lazy natural evaluation
- Casting + Lazy?
- Eager evaluation

Joins



- Lazy loading
  - Natural Joins / Table chaining
- Eager Loading
  - „With Joins“
    - With/WithXXX } Foreign-Key relationship present
    - WithOne
    - WithMany

      } No Foreign-Key relationship necessary (no referential integrity)
  - „Explicit Joins“
    - Join
    - LeftJoin
    - OuterJoin

      } Natural joins can be used as part of an explicit join, the join is then eager loaded

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Hands-on!

- Eager Joins
  - Select + Natural Joins + As
  - With

Various Functions

Ordering Results

- OrderBy, OrderByDescending
- ThenBy, ThenByDescending

```
db.Albums.All().OrderByGenreId()
                .ThenByArtistIdDescending();
```

Scalar Queries

- GetCount
- GetCountBy
- Exists, Any
- ExistsBy, AnyBy

```
int albumCount = db.Albums.GetCount(
                                db.Albums.GenreId == 2);
```

Query Modifiers

- Select
  - Star & AllColumns

```
db.Albums.All().Select(db.Albums.Title,
                       db.Albums.ArtistId);
```

Query Modifiers

- Column Aliasing: As(string)

```
var albums = db.Albums.All().Select(
                        db.Albums.AlbumId,
                        db.Albums.Title.As("AlbumName"));
```

Query Modifiers

- Where clauses
  - Operators (+, -, *, /, %)
  - IN, BETWEEN, LIKE, IS NULL

```
var albums = db.Albums.FindAllByGenreId(1)
        .Select(db.Albums.Title)
        .Where(db.Albums.Price < 8);

db.Albums.All().Where(
        db.Albums.Title.Like("%Side Of The%"));
```


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Aggregate Functions

- Grouping and Aggregates
  - Having → Group By / Having
  - Min, Max, Avg, Sum

```
var cheapAlbums = db.Albums.All()
        .Having(db.Albums.Price < 9).ToList();

var totalCost = db.Albums.All().Select(
        db.Albums.Price.Sum().As("TotalCost"));
```

Stored Procedures

- Like a function...

```
CREATE PROCEDURE ProcedureWithParameters
@One VARCHAR(MAX),
@Two VARCHAR(MAX)
AS

SELECT *  FROM Customers
WHERE Firstname = @One and Lastname like @Two
```

```
db.ProcedureWithParameters(1, 2);
```

Transactions

- Wrap up the calls

```
using (var transaction = db.BeginTransaction())
{
        transaction.albums.Insert(GenreId: 1...);
        transaction.Commit();
}
```

Tool & Testing

Tool: Simple.Data.Pad

- Similar to LINQ-Pad... kind of...
  - https://github.com/markrendle/Simple.Data.Pad

Simple.Data.Pad 0.16.2

Connection

OpenConnection (Data Source=.\SQLEXPRESS;Initial Catalog=world;Integrated Security=True)

Run

```
db.city.FindAllByCountryCode("USA").Where(db.city.Population > 1000000);
```

ID	Name	CountryCode	District	Population
3793	New York	USA	New York	8008278
3794	Los Angeles	USA	California	3694820
3795	Chicago	USA	Illinois	2896016
3796	Houston	USA	Texas	1953631
3797	Philadelphia	USA	Pennsylvania	1517550
3798	Phoenix	USA	Arizona	1321045
3799	San Diego	USA	California	1223400
3800	Dallas	USA	Texas	1188580
3801	San Antonio	USA	Texas	1144646

Results Trace

```
Simple.Data.Ado:
Text
select [dbo].[city].[ID],[dbo].[city].
[Name],[dbo].[city].[CountryCode],[dbo].
[city].[District],[dbo].[city].
[Population] from [dbo].[city] WHERE
([dbo].[city].[CountryCode] = @p1 AND
[dbo].[city].[Population] > @p2)
@p1 (AnsiStringFixedLength) = USA
@p2 (Int32) = 1000000
```

Results Trace

Testing: InMemoryAdapter

```
[Test]
public void Should_do_something()
{
        var adapter = new InMemoryAdapter();
        Database.UseMockAdapter(adapter);
        var db = Database.Open();
        db.Test.Insert(Id: 1, Name: "Alice");
        //...
}
```

- The InMemoryAdapter supports
  - Joins, Transactions, Stored procedures...

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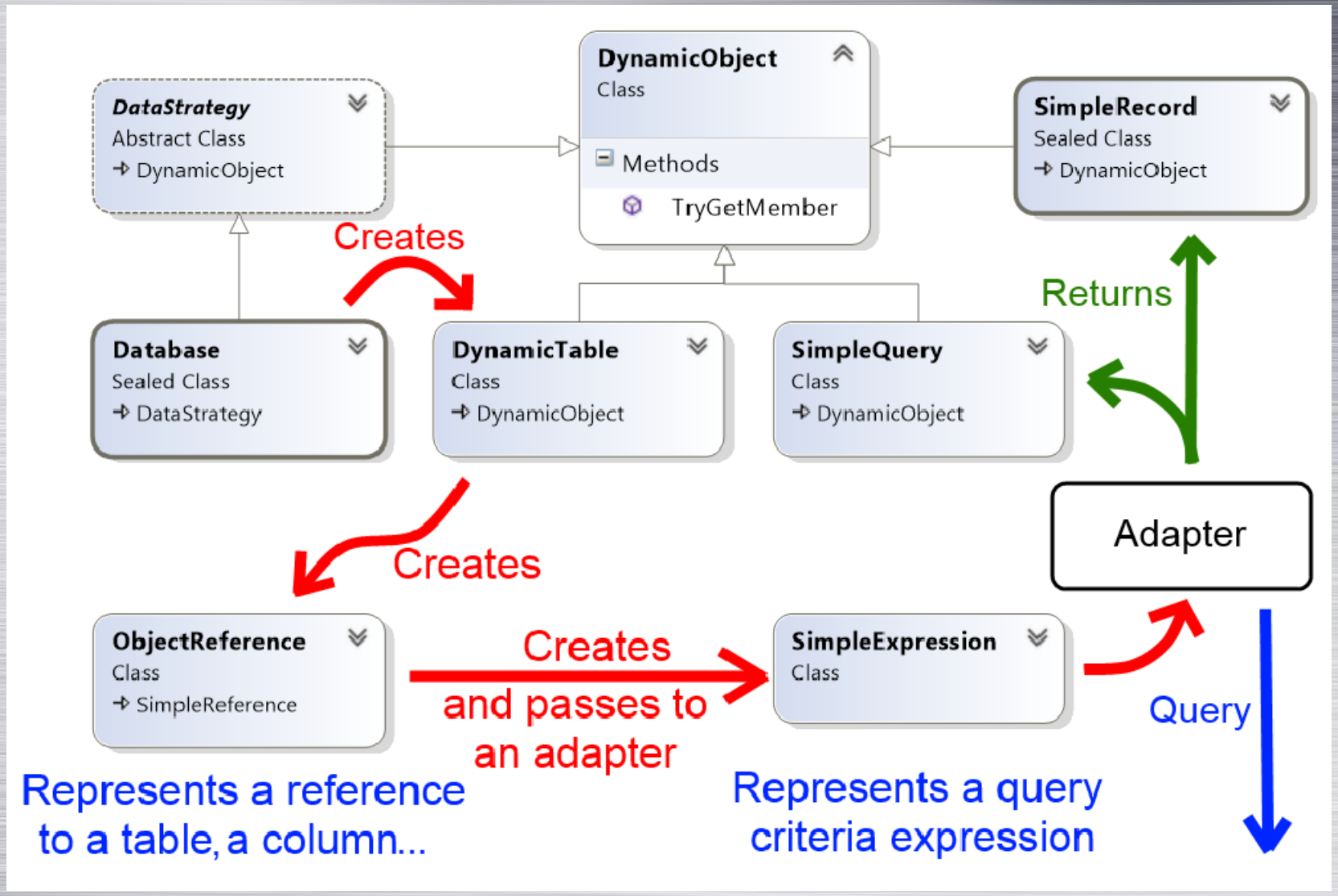
InMemoryAdapter Configuration

- Tweaking functions
  - SetKeyColumn
  - SetAutoIncrementColumn
  - AddFunction (stored procedure)
  - ConfigureJoin
  - …

Design



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Wrap-Up

Wrap-up

- OpenSource, Mono
- Everything is dynamic
- Fluid-, Indexer Way
- CRUD
  - FindXXX, DeleteXXX, UpdateXXX etc.
- Dynamics Objects Returned
- Joins, lazy, eager
  - Natural, WithXXX, Join
- Various Functions
  - Group, Order, Scalar, Modifiers etc.
- Tool & Testing
- Design

Simple.Data in Short

- Lightweight
- Readable
- Compelling
- Fun to use
- Interesing design

- Dynamics extensive testing
- Good understanding upfront

- My Recommendation
  - Try it and study it
  - Take it for a spin for some tooling and/or prototyping
  - ...and some projects?

Further Reading

- Github
  - https://github.com/markrendle/Simple.Data

- Nuget
  - http://nuget.org/packages?q=simple.data

- GoogleGroup
  - https://groups.google.com/forum/?fromgroups#!forum/simpledata

- Mark Rendle
  - @MarkRendle
  - http://blog.markrendle.net/

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Ich freue mich auf Eure Fragen!

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