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"Charting the Course ...

... to Your Success!"

Database Programming with ADO.NET, LINQ & Entity Framework

for Visual Studio 2012 and .NET 4.5, or Visual Studio 2010 and .NET 4.0

Course Summary

Description

This course compares ADO.NET and Entity Framework techniques; the labs can be done in any type of Windows project (Win Forms or WPF), or web application (web forms or MVC). The course can be adapted to many different environments, including versions of .NET and related software, databases (Oracle, etc), etc.

Objectives

At the end of this course, students will be able to:

- Identify the advantages and disadvantages of classic ADO.NET techniques, LINQ-to-whatever techniques, and the Entity Framework (EF); within an EF environment, the pros and cons of using LINQ or Entity SQL as the query language
- Create ADO.NET connections and related objects, and use SQL statements and stored procedures for database processing
- Read scalar values from a database, or read data sequentially with a DataReader, and populate common Windows and web controls
- Update, insert and delete rows, using Commands, Parameters and Transactions
- Retrieve data and store it in memory for extended periods of time, using a DataAdapter and DataSet; search, sort, and otherwise manipulate data using features of the DataSet
- Understand the purposes and differences between the Entity Framework and LINQ
- Use LINQ to access any input type, including XML files, collections of objects, and databases (LINQ to SQL)
- Use a LINQ-to-SQL class, and write common LINQ queries, including joins, subqueries, grouping, paging queries, etc
- Create an Entity Data Model, and use either LINQ or Entity SQL statements to query a database; use associations to navigate among tables
- Use an Entity Data Model to insert, update and delete databases
- Create ADO.NET (WCF) Data Services

Topics

- Introduction
- Connections and providers
- Reading data
- Updating data
- Creating DataSets
- Searching DataSets
- LINQ (Language Integrated Query
- The Entity Framework
- Updating DataSets
- Using Large Objects
- Using XML
- DataBinding

Audience

This course is designed for Application developers with experience in creating .NET applications in either VB.NET or C#.

Prerequisites

Students should have basic experience with a relational database system such as SQL Server, Oracle, DB2, MySQL, etc. The course assumes experience similar to having taken *Introduction to .NET Programming with VB and C#*, and/or *ASP.NET Workshop;* this course compares ADO.NET and Entity Framework techniques; the labs can be done in any type of Windows project (Win Forms or WPF), or web application (web forms or MVC).

Duration

Five days

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Course Outline

I. Introduction
- A. Comparison of various techniques; using the Server Explorer
- B. Using stored procedures

II. Connections and providers
- A. Connection strings for various types of databases and environments
- B. Scope of connection variables
- C. Externalizing the connection string
- D. Connection pooling

III. Reading data
- A. Reading scalar values
- B. Using commands with parameters using DataReaders
- C. Returning multiple results sets efficiently

IV. Updating data
- A. Using commands and parameters
- B. Identity keys
- C. Handling exceptions
- D. Using transactions, isolation options, nested Transactions and save points

V. Creating DataSets
- A. Techniques for filling a DataSet; generic and strongly-typed DataSets
- B. Data Adapters
- C. ASP.NET considerations, including static variables, Cache, Application and Session variables
- D. Importing and exporting DataSets to XML files

VI. Searching DataSets:
- A. Adding and removing columns, computing expressions
- B. The Find method
- C. Navigating parent-child relationships with GetParentRow and GetChildRows
- D. Creating subsets with Select or DataViews

VII. LINQ (Language Integrated Query)
- A. LINQ vs. the Entity Framework
- B. LINQ queries on databases and datasets
- C. LINQ functions, joins and associations, subqueries, grouping;
- D. Using LINQ functions to create paging queries
- E. Examples of LINQ on XML, collections of objects, text files

VIII. The Entity Framework
- A. Creating an Entity Data Model
- B. Writing LINQ and Entity SQL queries on the EDM
- C. Associations
- D. Updating
- E. Creating Data Services and using them from client applications

IX. Updating DataSets
- A. Updating, inserting and deleting single rows
- B. Using RowState and RowStateFilter
- C. Concurrency issues
- D. Updating batches of rows

X. Using Large Objects
- A. Overview of binary large objects in databases
- B. Reading binary data into controls, onto web pages, or to files
- C. Updating binary large objects

XI. Using XML
- A. Reading and writing data between DataSets and XML files
- B. Appending and writing XML files

XII. DataBinding
- A. Using DataSources and controls such as grids
- B. Customizing the display of data
- C. Modifying data during the binding process
- D. Filtering and sorting
- E. Updating DataSources