

This three-day, intensive course teaches the essential elements of ADO.NET such that, at the end of the course, the programmer is able to utilize its tremendous database manipulation powers to build effective database applications. The course includes a major case study demonstrating the use of ADO.NET in a realistic setting. It is current to .NET 4.0, Visual Studio 2010, and SQL Server 2008.

### Course Objectives:

- Describe the architecture and main classes of ADO.NET.
- Gain fluency in programming ADO.NET using C#.
- Gain a thorough understand of the use of disconnected DataSets for building highly scalable applications.
- Acquire a working knowledge of the tight coupling of XML with ADO.NET
- Learn how to use additional features in ADO.NET, including asynchronous operations, multiple active result sets, and bulk copy.
- Acquire a working knowledge of LINQ and the Entity Framework
- Implement a realistic case study that ties together many concepts of ADO.NET in a practical demonstration.

**Audience:** C# .NET developers needing to communicate with datasources.

**Prerequisites:** A basic knowledge of SQL and of programming the .NET Framework using C#. The student should also understand the fundamentals of XML. To get full benefit from the examples in the course the student should be able to write simple Windows Forms applications. A working knowledge of SQL Server is also desirable.

**Number of Days:** 3 days

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| <p><b>1. Introduction to ADO.NET</b><br/>         Microsoft Data Access Technologies<br/>         ODBC<br/>         OLE DB<br/>         ActiveX Data Objects (ADO)<br/>         Accessing SQL Server before<br/>             ADO.NET<br/>         ADO.NET<br/>         ADO.NET Architecture<br/>         .NET Data Providers<br/>         Programming with ADO.NET Interfaces<br/>         .NET Namespaces<br/>         Connected Data Access<br/>         ADO.NET Class Libraries<br/>         Connecting to an OLE DB Data Provider<br/>         Using Commands<br/>         Creating a Command Object</p> | <p>ExecuteNonQuery<br/>         Using a Data Reader<br/>         Disconnected Datasets<br/>         Data Adapters<br/>         Acme Computer Case Study<br/>         Buy Computer<br/>         Model<br/>         Component<br/>         Part<br/>         PartConfiguration<br/>         System<br/>         SystemId as Identity Column<br/>         SystemDetails<br/>         StatusCode<br/>         Relationships<br/>         Stored Procedure</p> |
| <p><b>2.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p><b>ADO.NET Connections</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                         |

- ADO.NET Block Diagram
- .NET Data Providers
- Namespaces for .NET Data Providers
- Basic Connection Programming
- Using Interfaces
- IDbConnection Properties
- Connection String
- SQL Server Connection String
- OLE DB Connection String
- SQL Server Security
- IDbConnection Methods
- BasicConnection (Step 2)
- Connection Life Cycle
- BasicConnect (Step 3)
- Database Application Front-ends
- ChangeDatabase
- Connection Pooling
- Pool Settings for SQL Server
- Connection Events
- ADO.NET Exception Handling
- 3. ADO.NET Commands**
- Command Objects
- Creating Commands
- Executing Commands
- Dynamic Queries
- Parameterized Queries
- Command Types
- Stored Procedures
- Testing the Stored Procedure
- Stored Procedures in ADO.NET
- Batch Queries
- Transactions
- 4. DataReaders and Connected Access**
- DataReaders
- Using a DataReader
- Closing a DataReader
- IDataRecord
- Type-Safe Accessors
- GetOrdinal()
- Null Data
- Testing for Null
- ExecuteReader Options
- Returning Multiple Result Sets
- DataReader Multiple Results Sets
- Obtaining Schema Information
- 5. DataSets and Disconnected Access**
- DataSet
- DataSet Architecture
- Why DataSet?
- DataSet Components
- DataAdapter
- Data Access Class
- Retrieving the Data
- Filling a DataSet
- Accessing a DataSet
- Updating a DataSet Scenario
- Adding a New Row
- Searching and Updating a Row
- Deleting a Row
- Row Versions
- Row State
- BeginEdit and CancelEdit
- DataTable Events
- Updating a Database
- Insert Command
- Update Command
- Delete Command
- Exception Handling
- Command Builders
- 6. More About DataSets**
- Filtering DataSets
- Using a Single DataTable
- Multiple Tables
- DataSet Architecture
- Schema in the DataSet
- Relations
- Navigating a DataSet
- Using Parent/Child Relation
- Inferring Schema
- AddWithKey
- Adding a Primary Key
- TableMappings
- Identity Columns
- Creating a Dataset Manually
- Manual DataSet Code
- 7. XML and ADO.NET**
- ADO.NET and XML
- Rendering XML from a DataSet
- XmlWriteMode
- Reading XML into a DataSet
- DataSets and XML Schema
- ModelSchema.xsd
- Reading XML Schema
- XmlReadMode
- Writing Data as Attributes
- XML Data in DataTables

- Typed DataSets
- Table Adapter
- Using a Typed DataSet
- Synchronizing DataSets and XML
- Using XmlDataDocument
- Windows Client Code
- Web Client Code
- XML Serialization
- Default Constructor
- 8. Concurrency and Transactions**
- DataSets and Concurrency
- Handling Concurrency Violations
- Pessimistic Concurrency
- Transactions
- Programming ADO.NET Transactions
- ADO.NET Transaction Code
- Using ADO.NET Transactions
- DataBase Transactions
- Transaction in Stored Procedure
- Testing the Stored Procedure
- SQL Server Error
- 9. Additional Features**
- AcmePub Database
- Connected Database Access
- Long Database Operations
- Asynchronous Operations
- Multiple Active Result Sets
- Bulk Copy
- 10. LINQ and Entity Framework**
- Language Integrated Query (LINQ)
- LINQ to ADO.NET
- Bridging Objects and Data
- Object Relational Designer
- IntelliSense
- Basic LINQ Query Operators
- Obtaining a Data Source
- Filtering
- Ordering
- Aggregation
- Obtaining Lists and Arrays
- Deferred Execution
- Modifying a Data Source
- Performing Inserts via LINQ to SQL
- Performing Deletes via LINQ to SQL
- Performing Updates via LINQ to SQL
- LINQ to DataSet
- Using the Typed DataSet
- ADO.NET Entity Framework
- Exploring the EDM
- AcmePub Tables
- AcmePub Entity Data Model
- XML Representation of Model
- Entity Data Model Concepts
- Conceptual Model
- Storage Model
- Mappings
- Querying the EDM
- Class Diagram
- Context Class
- List of Categories
- List of Books
- Entity Framework in a Class Library
- Data Access Class Library
- Client Code
- 11. Appendix A – Acme Computer Case Study**