

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 4.5.1, Visual Studio® 2013 and SQL Server® 2012.

Audience: C# .NET developers needing to communicate with data sources.

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

1. Introduction to ADO.NET

Microsoft Data Access Technologies
 ODBC
 OLE DB
 ActiveX Data Objects (ADO)
 Accessing SQL Server before ADO.NET
 ADO.NET
 ADO.NET Architecture
 .NET Data Providers
 Programming with ADO.NET Interfaces
 .NET Namespaces
 Connected Data Access
 SQL Express LocalDB
 SqlLocalDB Utility
 Visual Studio Server Explorer
 Queries
 SQL Server Management Studio
 ADO.NET Class Libraries
 Connecting to an OLE DB Data Provider
 Using Commands
 Creating a Command Object
 ExecuteNonQuery
 Using a Data Reader
 Disconnected Datasets
 Data Adapters
 Buy Computer
 Model
 Component
 Part

PartConfiguration
 System
 SystemId as Identity Column
 SystemDetails
 StatusCode
 Relationships
 Stored Procedure

2. ADO.NET Connections

ADO.NET Block Diagram
 .NET Data Providers
 Namespaces for .NET Data Providers
 BasicConnect (version 1)
 Using Interfaces
 IDbConnection Properties
 Connection String
 SQL Server Connection String
 OLE DB Connection String
 SQL Server Security
 IDbConnection Methods
 BasicConnect (version 2)
 Connection Life Cycle
 BasicConnect (version 3)
 Database Application Front-ends
 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
- Testing in Server Explorer
- 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

- 9. 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**
- 12. **Appendix B – SQL Server 2012 Express**
 - SQL Server Express
 - SQL Server 2012 Express LocalDB
 - AttachDBFileName
 - Database
 - Moving from LocalDB to SQL Server
- 13. **Appendix C – Learning Resources**