Course 464:
XML and Web Services Programming with VS.NET 2005
(5 days)

Course Description

In the 90's, the Web connected people to applications. XML and Web Services go to the next level by connecting enterprise-wide applications across multiple companies. Learn how to architect, develop, debug, deploy, consume, and secure Web Services using the .NET environment. In-depth coverage of topics such as .NET XML APIs, ADO.NET XML features, DOM, SOAP, asynchronous Web Service call techniques and many more are discussed and experienced firsthand.

The course includes discussions and lab exercises detailing how to create and consume ASP.NET Web Services as well as an introduction to Microsoft's Windows Communication Foundation (WCF). Students also learn the pros and cons of the different .NET XML APIs and understand when Web Service technologies are appropriate to use in an application (and when they're not). Students will leave with a practical knowledge of how XML and Web Services can be leveraged and used to integrate different systems.

This course is written by Microsoft MVP Dan Wahlin.

Prerequisites…

This course was created for intermediate to advanced level .NET developers. Attendees should have a working knowledge of VB.NET or C# and understand Object-Oriented Programming techniques. Experience building Windows Forms and/or ASP.NET Web Forms is recommended. This course uses C# as its primary .NET language.

Learning Objectives…

- Describe the pros and cons of using XML in applications
- Learn XML syntax and rules
- Understand XSD schemas and their role
- Create XSLT stylesheets to transform XML into other formats
- Work with fast, forward-only XML reader classes
- Edit XML documents using XPathNavigator and XmlDocument classes
- Create and consume Web Services using the .NET Framework
- Convert relational data to XML and back
- Serialize .NET CLR types to XML using the XmlSerializer
- Build SOAP extensions that can parse and manipulate Web Service messages dynamically
- Understand the benefits of Windows Communication Foundation (WCF)

See next page for a detailed course outline…

Course Outline

Chapter 1 - XML and .NET Development

- What is XML?
- Why use XML?
- "X" is for eXtensible?
- Differences between HTML and XML
- Understanding the benefits of XML
- Top 5 uses for XML in .NET Applications

Chapter 2 - XML Fundamentals

- What's in an XML Document?
- What's a well-formed XML Document?
- Valid XML Documents
- The XML Declaration
- XML Elements
- XML Attributes
- XML Processing Instructions
- XML Comments
- CDATA Sections
- XML Namespaces
    - Namespace Structure
    - Default Namespaces
    - Qualified Namespaces
- Hands-On Lab – Creating an XML document

Chapter 3 - Understanding DTDs and XML Schemas

- Why use DTDs or Schemas?
- Do I Really Need to Validate?
- The W3C XML Schema
    - Differences between DTDs and XML Schemas
    - W3C Schema Elements and Attributes
    - Schema Particles
    - Data Type Definitions
    - Creating Unique Fields, Keys, and Relationships
    - Namespace Support in Schemas
    - Referencing XML Schemas from within XML Documents
    - XML Schema Summary
- Hands-On Lab – Creating an XSD Schema to Validate an XML Document

Chapter 4 - Using the XmlReader and XmlWriter Classes

- Introducing the System.Xml Assembly
- .NET XML Parsing APIs
- In Memory vs. Forward Only Cursor-Based Parsing
- XmlReader Vs. SAX
- Using the XmlReader Class to parse XML
- Validating XML Documents using the XmlReader and XmlReaderSettings
- Hands-On Lab – Validating an XML Document against an XML Schema
- Handling Entities
- Dynamically Validating XML Documents by Assigning DTDs and Schemas to XML at Runtime
- Leveraging the XmlParserContext Class to parse XML fragments
- Using the XmlWriter Class to Create XML Documents
- Working with the XmlWriterSettings class
- Hands-On Lab – Moving XML data into a Database using the XmlReader

Chapter 5 - Programming the Document Object Model (DOM)

- What is the DOM?
- In Memory vs. Forward Only Cursor-Based Parsing
- DOM Classes in the System.Xml Namespace and Assembly
- The XmlNode Class
- The XmlDocument Class
- The XmlNodeList Class
- The XmlNamedNodeMap Class
- Importing nodes from multiple DOM Structures
- What is XPath?
- Creating XPath Expressions
- Selecting Nodes within the DOM using XPath
- Hands-on Lab – Understanding XPath
- Understanding the XmlNamespaceManager
    - What is the XmlNamespaceManager Class used for?
    - Adding Namespaces into the XmlNamespaceManager
    - Selecting nodes within a default or qualified namespace using the XmlNamespaceManager and XPath
- Understanding the XPathNavigator Class
    - Creating an XPathNavigator Instance
    - XPathNavigator Properties and Methods
    - Walking XML with the XPathNavigator Class
    - Selecting Nodes with the XPathNavigator and XPathNodeIterator Classes
    - Using the XPathExpression and XPathNavigator Classes to sort XML
- Hands-On Lab – Extracting XML Data using the DOM and XPath

Chapter 6 - Leveraging ADO.NET's XML features

- Introducing ADO.NET
- ADO.NET Fundamentals
    - ADO.NET Managed Providers
    - The Connection Classes
    - The Command Classes
    - The DataAdapter Classes
- The DataSet Class
    - What is the DataSet Class?
    - What is the DataSet Class Composed of?
    - DataSet XML Properties and Methods
    - Viewing DataSets as XML
    - Loading DataSets with XML
    - Saving DataSets and DataTables as XML
    - Loading DataSets with XSD Schemas
- Working with the DataSet and XmlDataDocument Classes
    - XmlDataDocument Properties and Methods
    - Syncing the XmlDataDocument and DataSet Classes
- Shaping XML with DataSet Columns and the MappingType Enumeration
- Binding XML to Web Server Controls using the DataSet
    - Filtering with DataViews and DataTables
    - Sorting and Paging XML with the DataView and DataGrid
- Using DataSets to work with Hierarchical XML Data

Chapter 7 - Transforming XML with XSLT

- What is XSLT?
- How does XSLT work?
    - The XSLT Root Element
    - Understanding the role of Templates in XSLT

    - XSLT Top-Level and Template-Body Elements
    - Transforming XML into another Form of XML using XSLT Elements
- XPath/XSLT Functions and uses
- .NET Classes Involved in Transforming XML
    - The XPathDocument Class
    - The XsltCompiledTransform Class
    - The XsltArgumentList Class
    - XSLT Output Techniques in ASP.NET
- Using the asp:Xml Web Server Control
- Demonstration – Creating and using XSLT Extension Objects
- Hands-On Lab – Transforming XML with XSLT

Chapter 8 - XML Serialization

- What is XML Serialization?
- When would I use XML Serialization?
- Classes in the System.Xml.Serialization Namespace
- Serializing objects to XML
- Deserializing XML Documents to objects
- Using XML Serialization Attributes
    - Defining the root element
    - Defining attributes and elements
    - Defining text
    - Handling arrays and array items

Chapter 9 - Creating and Consuming Web Services

- What are Web Services?
- Why do we need Web Services?
- Web Service Examples
- Web Service Fundamentals
    - Web Service Protocols (SOAP, HTTP-GET,HTTP-POST)
    - Web Service Architecture (XML/SOAP, WSDL, UDDI)
    - Understanding SOAP
    - WSDL Documents and XSD Schemas
    - Discovering Web Services with UDDI
- Understanding the role of attributes in .NET Web Services
- Using the WebService and WebMethod attributes
- Handling namespaces, transactions, state, and more with attributes
- Overloading Web Service methods
- Creating a Web Service
- Web Service proxies and wsdl.exe
- Consuming a Web Service
- Hands-On Lab – Creating and Consuming a Web Service in .NET

Chapter 10 - Advanced Web Service Techniques

- Asynchronous Web Services
    - Synchronous vs. Asynchronous Web Service Calls
        - Callbacks
        - WaitHandles
        - Polling
- Customizing SOAP headers
    - The SoapHeaderAttribute Class
    - The SoapHeader Class
- Hands-On Lab – Building SOAP Headers
- Developing custom SOAP extensions:
    - The SoapExtensionAttribute Class

    - The SoapExtension Class
- Hands-On Lab – Building SOAP Extensions

Chapter 11 – Introduction to WCF

- What is WCF?
- Creating a WCF Service
    - Service Contracts
    - Data Contracts
    - Behaviors and protocols
- Using svcutil.exe to build a proxy
    - Understanding and using config files
- Consuming WCF Services from ASP.NET

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