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## **2663 –Programming with XML in MS .NET Framework**

**3 Day**

This three-day instructor-led course teaches developers how to program with XML in the Microsoft .NET Framework in order to build Microsoft Windows or Web-based integrated applications that are easier to build, scalable, and flexible.

### **WHO SHOULD ATTEND**

This course is intended for:

- Programmers who build Web-based or Windows applications that access data
- Programmers who build Web services
- Programmers who build applications that access data stored as XML

This course is not recommended for developers who:

- Want to learn a programming language, such as Microsoft Visual Basic .NET or Microsoft Visual C#
- Want an introduction to XML and related technologies
- Want advanced-level information on developing XML-based applications
- Want to learn how to program by using Microsoft XML Core Services (MSXML), or how to program with XML in Microsoft Internet Explorer 6.0

### **PREREQUISITES**

Before attending this course, students must have:

- Experience with programming languages such as Visual Basic .NET or Microsoft Visual C#.
- Experience using the Microsoft Visual Studio .NET developer environment.
- Experience building applications using the Extensible Stylesheet Language for Transformation (XSLT), XML Path Language (XPath), and XML schemas.



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## AT COURSE COMPLETION

After completing this course, students will be able to:

- Explain how XML is integrated into the .NET Framework and the classes associated with XML in the .NET Framework.
- Parse and read XML in the .NET Framework.
- Write and validate an XML document.
- Manipulate cached XML documents in memory.
- Query XML documents.
- Transform XML documents.
- Create new XML schemas programmatically.

## LESSON TOPICS

### Module 1: Introduction to XML in the .NET Framework

This module introduces the use of XML in the .NET Framework to help you solve common business problems. XML is a standards-driven technology that is ideal for applications that use the Internet. Microsoft's implementation of World Wide Web Consortium (W3C) standards ensures that applications you develop with XML in .NET will successfully communicate with other W3C-compatible applications

#### Lessons

- Overview
- Course at a Glance
- Common Business Problems
- XML in the .NET Framework

After completing this module, students will be able to:

- Explain how XML provides solutions to common business problems.
- Discuss how Microsoft's implementation of W3C standards for XML provides a framework for XML solutions to business problems.
- Diagram XML support in the .NET Framework.



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## Module 2: Parsing XML

This module discusses how to parse XML data from a file, string, or stream by using the `XmlReader` class. It also covers how to use the `XmlTextReader` to process XML as text, and how to use the `XmlNodeReader` to filter data by using an XPath expression and the object.

### Lessons

- Overview of XML Parsing
- Parsing XML Using `XmlTextReader`
- Creating a Custom Reader

### Lab 2.1: Parsing XML

- Exercise 1: Building an XML Web Service to Parse XML

After completing this module, students will be able to:

- Create a Stream object from an XML file.
- Build a mutable string by using the `StringBuilder` object.
- Handle errors in the form of XML.
- Parse XML as text by using the `XmlTextReader` object.
- Create a custom `XmlReader` object.

## Module 3: Validating XML

This module gives an overview of XML Schema Definition (XSD) data types, and then covers how to use the Microsoft .NET Framework XML classes to perform XML schema validation. The lesson Advanced Validation teaches how to resolve external entities, how to validate XML fragments, and how to validate XML by using a Document Type Definition (DTD).

### Lessons

- Examining Schemas
- Validating XML While Parsing
- Advanced Validation

### Lab 3.1: Validating XML

- Exercise 1: Extend an XML Web Service to Validate XML



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After completing this module, students will be able to:

- Instantiate an XML validating reader.
- Associate one or more XML schemas with an XML validating reader.
- Handle errors that result when a validating reader processes invalid XML.
- Create an application that uses the .NET Framework XML classes and XML schemas to validate an XML fragment.
- Resolve a Uniform Resource Identifier (URI) reference to a schema or DTD.
- Create an application that uses the .NET Framework XML classes and an XSD schema or a DTD to validate well-formed XML.

#### **Module 4: Writing XML**

Writing XML is a central skill in developing XML-based applications. This module describes the .NET Framework classes that are used to write XML with or without namespaces. The module also explains how to control the format and validity of XML as it is being written.

##### **Lessons**

- Overview of Generating XML Documents
- Writing XML
- Generating XML with Namespaces
- Controlling XML Format and Converting XML

##### **Lab 4.1: Writing XML**

- Exercise 1: Building an XML Web Service to Write XML

After completing this module, students will be able to:

- Use the XmlTextWriter class to write well-formed XML.
- Generate namespaces for elements and attributes.
- Control indentation and other code format characteristics when generating XML.
- Write XML that preserves characters that are normally represented by using escape characters.

#### **Module 5: Querying XML**

This module explains the process of querying an XML document by using XPath. It explains how to write code to load an XML document, and how to create a navigation cursor by using an XPathNavigator object. It also explains how to create your query by using an XPathDocument object,



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and how to examine the result types. In addition, this module describes how to compile your query and evaluate your results.

### Lessons

- Introduction to Querying XML Using XPath
- Creating and Navigating a Document Cache
- Executing Your Query

### Lab 5.1: Querying XML Documents Using XPath

- Exercise 1: Creating and Loading an XML Data Cache
- Exercise 2: Compiling and Executing Queries That Return Nodes
- Exercise 3: Compiling and Executing Queries That Return Numbers
- Exercise 4: Compiling and Executing Queries That Return Strings

After completing this module, students will be able to:

- Describe the business reasons for querying XML documents by using XPath.
- Cache XML data for querying by using an XPathDocument object.
- Create an XPathNavigator object to navigate through an XML document.
- Compile and evaluate the result of an XPathExpression object.
- Iterate through an XmlNodeList object returned by an XPath expression.

### Module 6: Manipulating Cached XML

This module introduces the XML Document Object Model (XML DOM) and explains how to locate and manipulate XML by using the DOM.

### Lessons

- Introduction to the XML Document Object Model
- Navigating XML Using the DOM
- Creating New Nodes
- Modifying and Deleting Nodes

### Lab 6.1: Manipulating Cached XMLDocument Objects

- Exercise 1: Loading an XML Document
- Exercise 2: Navigating an XML Document
- Exercise 3: Adding Elements and Comments to an XML Document
- Exercise 4: Modifying and Deleting Information



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After completing this module, students will be able to:

- Open and save XML by using the DOM.
- Locate XML by using the DOM.
- Create nodes in the XML node tree.
- Modify and delete nodes in the XML node tree.

## **Module 7: Transforming XML**

This module explains the process of transforming XML documents. The module teaches the student how to apply an XSLT transformation to an XML document by using the .NET XML classes. It does not teach XSLT syntax or commands.

### **Lessons**

- Introduction to Transforming XML
- Programming the XslTransform Class
- Extending XSLT Style Sheets

### **Lab 7.1: Transforming XML Documents**

- Exercise 1: Applying a Style Sheet
- Exercise 2: Using Style Sheet Parameters
- Exercise 3: Extending a Style Sheet with an Extension Object

After completing this module, students will be able to:

- List the business use cases for using XSLT.
- Describe the transformation process.
- Apply style sheets to XML documents by using the XslTransform class.
- Display XML by using the ASP.NET Xml Web Forms control.
- Pass parameters to XSLT style sheets.
- Apply a style sheet that references an extension object.

## **Module 8: Serializing Objects as XML**

This module provides students with the skills needed to create XML documents from the data contained within programmatic objects. This process is referred to as serialization and can be used to persist object data or to share object data between applications.



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## Lessons

- Introduction to XML Serialization
- Serializing Objects Using XmlSerializer
- Controlling XML Serialization

## Lab 8.1: Serializing Objects as XML

- Exercise 1: Serializing a Purchase Order
- Exercise 2: Controlling Serialization with Attributes
- Exercise 3: Deserializing an Invoice

After completing this module, students will be able to:

- Define XML serialization.
- Serialize and deserialize objects by using the XmlSerializer class.
- Control XML serialization by using attributes