

**Course 419:**  
**Implementing a Service Oriented Architecture with  
XML Web Services in .NET  
(5 days)**

This in-depth, advanced workshop will explain the need for a service-oriented architecture (SOA), best practices for integrating across enterprise systems using a SOA and provide concrete details on implementing web services with the .NET framework.

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.

**Who can benefit?**

This is an intermediate level .NET programming course, designed for architects and developers who wish to implement integration architectures using XML web services in .NET. The student should be an experienced .NET programmer, with practical development experience.

**Prerequisites**

Attendees should be proficient in the C# programming.

**Learning Objectives**

Students will leave this course armed with the skills to:

1. Design a Service Oriented Architecture with XML Web Services using .NET and WCF
2. Describe the structure of an XML document using schema
3. Interact with XML documents from the XmlReader and XmlWriter APIs, DOM, XPathDocument and XPathNavigator
4. Monitor SOAP messages between web services and clients
5. Write and deploy WSDL for contract first web services
6. Create contract-first and code-first web services
7. Create synchronous and asynchronous web service clients
8. Leverage custom SOAP extensions
9. Enable message reliability and security with WS-\* standards



## Course Outline

### Chapter 1: Introduction to SOA and Web Services

- What is Service Oriented Architecture (SOA)?
- Why SOA?
- Are Web Services SOAs?
- Web Service technologies and their relationship to SOA principles
- SOA Implementation Options
  - Contract first design
  - Code first design
  - Mixed design

### Chapter 2 - XML Document Structure

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

### Chapter 3 - XML Schemas and WSDL

- Why use Schemas?
- The W3C XML Schema
  - Differences between DTDs and XML Schemas
  - W3C Schema Elements and Attributes
  - Schema Particles
  - Creating Unique Fields, Keys, and Relationships
  - Namespace Support in Schemas
  - Referencing XML Schemas from within XML Documents
- The role of schemas in Web Services and WSDL
- WSDL structure:
  - Types
  - Messages
  - PortTypes and Operations
  - Bindings
  - Service
- Hands-On Lab – Defining schemas in WSDL documents

### 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
- 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
- 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 - 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 7 - Creating and Consuming Web Services

- 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 8 - Contract-First Web Services Design Principles

- Defining service types
  - Using the VS.NET schema designer
- Generating CLR types from schemas
- Defining messages, portTypes, operations and bindings
- Using contract first tools to create WSDL documents
- Blending contract-first and code first design techniques
- Hands-On Lab – Creating .NET Web Services using contract-first techniques



## Chapter 9 - Advanced Web Service Techniques

- Asynchronous Web Services
  - Synchronous vs. Asynchronous Web Service Calls
    - Callbacks
    - WaitHandles
    - Polling
    - Events
- 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 10 – Creating and Consuming WCF Web Services

- What is WCF?
- How does WCF fit into the SOA picture?
- 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
- Applying WS-\* standards with WCF
- Hands-on lab – Creating a WCF service and client

***Please contact your ROI representative to discuss course tailoring!***