

This course provides a realistic, hands-on, comprehensive coverage of developing Web services using .NET and C#. Web services are an evolving series of standards that enable programs on various computers to communicate with other programs on similar or disparate computers transparently over the Internet. This course teaches in detail the skills needed to program Web services using .NET technologies, both ASP.NET and Windows Communication Foundation (WCF). It also examines the fundamentals of SOAP, WSDL and REST. The course is current to .NET 4.0 and Visual Studio 2010, with coverage of newer features such as the WS-I Basic Profile 1.1, SOAP 1.2, the event pattern for calling Web services asynchronously, support for REST services, and more.

**Audience:** Programmers needing to integrate Web Services.

**Prerequisites:** Knowledge of the .NET Framework using C# and an understanding of the fundamentals of XML. Some experience in ASP.NET is advantageous.

**Number of Days:** 4 days

**1. What Are Web Services?**

What is a Web Service?  
Why are Web Services Needed?  
Distributed Object Computing  
Major Players in Web Services  
Web Services Interoperability  
Benefits of Web Service Integration  
SOAP  
UDDI  
Web Services Business Models  
Business Models Classified  
Service Oriented Architecture (SOA)  
Services Are Independent  
ASP.NET Web Services  
Alternative Technologies  
Web Service Enhancements 3.0  
Windows Communication Framework  
WCF and REST

**2. Web Services Fundamentals**

Understanding Web Services  
Internet Information Services  
IIS Manager  
Virtual Directory  
IIS Applications  
An Echo Web Service  
Echo Web Service Using ASP.NET  
SOAP Request  
Testing the Web Service

HTTP POST Request  
Hypertext Transfer Protocol (HTTP)  
HTTP Headers and Content  
HTTP Methods  
XML  
SOAP-Based Web Services  
Messaging Models  
Messaging Over the Web  
The SOAP Messaging Model  
SOAP Namespaces  
The SOAP Envelope  
The Message Header  
Header Entry Attributes  
The Message Body  
Service Descriptions  
Web Services Description Language  
Viewing WSDL  
Using WSDL  
wsdl.exe in .NET SDK

**3. Developing ASP.NET Web Services**

Developing Web Services in Visual Studio 2010  
Code for a Simple Web Service  
Hello World Web Service  
Concatenate Web Service  
WebService Directive  
Service.cs  
System.Web.Services Namespace

- WebService Attribute
- WebMethod Attribute
- BufferResponse
- MessageName
- Basic Profile
- Turning Off Conformance Checking
- Basic Profile Warning
- WS-I Basic Profile
- ASP.NET Configuration
- Multi-level Configuration
- Configuration Hierarchy
- A Conformant Web Service
- WebService Class
- 4. Web Service Clients**
- Protocols
- Accessing a Web Service
- Creating a Proxy
- Creating a Proxy using wsdl.exe
- Exploring the Generated Proxy Code
- Console Client Test Program
- Creating a Proxy via Visual Studio
- 5. ASP.NET Web Services Programming Model**
- Asynchronous Programming in Web Services
- Asynchronous Events
- State Management in ASP.NET
- Application and Session Objects
- Session Management
- Application Management
- ASP.NET Web Services Transactions
- Caching: An Overview
- Data to be Cached – Time Frame
- Output Caching
- Debugging
- Debugging a Web Service
- Enable Debugging in web.config
- Deploying a Web Service
- 6. XML Serialization**
- Serialization in .NET
- CLR Serialization
- Circular List and XML Serialization
- XML Serialization Infrastructure
- What Will Not Be Serialized
- XML Schema
- XSD Tool
- Opening Schema Files

- A More Complex Schema
- A Car Dealership
- Deserializing According to a Schema
- Type Infidelity
- Customizing XML Serialization
- XML Serialization and Web Services
- 7. More about SOAP**
- The SOAP Messaging Model
- SOAP Namespaces
- The SOAP Envelope
- The Message Header
- Using SOAP Headers in .NET
- Using SOAP Headers on the Client
- Call Body
- Response Body
- Returning Errors
- Document Style Web Services
- Document vs. RPC Style
- Wrapped vs. Bare Parameter Style
- Literal vs. Encoded Use
- SOAP 1.2
- Specifying the Transport Protocols
- Making a Request Using SOAP 1.2
- 8. More about WSDL**
- SOAP-Based Web Services
- Component-Based Software
- Component Models
- Web Services as Components
- A World without Type Information
- The Need for Service Description
- An IDL for Web Services
- Web Services Description Language
- WSDL Namespaces
- The WSDL Description Model
- A Bird's Eye View
- WSDL Descriptors as Schema
- The Schema for WSDL Descriptors
- Associations between Components
- Interface Description
- Messaging Scenarios
- Operations: Input, Output, and Fault Messages
- Service Description
- Extending WSDL
- The Binding Component
- A Structural Pattern
- The SOAP Binding

Document vs. RPC Style  
Encoded vs. Literal Use  
Using WSDL Files  
An Abstract Class  
Implementing the Web Service  
WSDL First!  
WSDL Support in .NET  
WSDL Viewer Tool  
WSDL Viewer Source Code

**9. Data Access with Web Services**

Multiple-Project Solutions  
A Windows Application Client Project  
Adding a Web Reference  
Multiple Projects in Solution Explorer  
Implementing the Client  
Multiple-Tier Data Access  
A Data Access Web Service  
Data Access Client Code  
An Enhanced Web Service  
Client for Enhanced Web Service  
Objects in a ListBox  
Web Services Pass Data  
LocalCourse  
Client Code  
Binding to a Web Service

**10. Introduction to WCF**

What is WCF?  
WCF Services  
Service Orientation  
WCF and Web Services  
WCF = ABC  
Address, Binding, Contract  
Hosting Services  
A Website for the Service  
Service Configuration  
Configuration Details  
Examining the Service in the Browser  
WCF Clients  
Creating WCF Clients  
Add Service Reference Dialog  
Interop with ASMX Web Services  
EchoAsmx  
EchoWcf  
ASMX Client  
WCF Client  
Data Contracts  
Operation Contract

Client Program  
Deploying a WCF Web Service  
**11. REST Web Services**  
REST  
Representation, State and Transfer  
Collections and Elements  
Using Fiddler  
Result Details  
Raw View  
REST Service Help Page  
Help for POST Request  
Content-Type  
New Course  
Starter Code  
Help Page  
Help Page for GET  
Route Table  
Person Class and Collection  
Exercising the GET Verb  
Using UriTemplate  
Deploying to IIS  
GET Methods  
Test of GET Methods  
POST Method  
InstanceContextMode  
REST Service Clients  
Using WebClient  
XML Deserialization  
Other HTTP Verbs  
XML Serialization  
Windows Client Program  
Debugging with Fiddler  
Content-Type