Web Service Fundamentals using C# and ASP.NET

Course No. 9418

Description

This course provides a realistic, hands-on, comprehensive coverage of developing Web services using ASP.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 ASP.NET. It also examines the fundamentals of SOAP and WSDL essential for creating interoperable Web services.

The first chapter introduces Web services, including evolution, motivation, backbones, and reasons to embrace Web services. Chapter 2 exposes the anatomy of a Web service through hands-on exploration and tracing of a simple Web service, examining HTTP, XML, SOAP and WSDL. Web services are developed using the .NET Framework SDK.

Chapter 3 covers the details of how to create and debug ASP.NET Web services using Visual Studio .NET. Chapter 4 shows how to create clients for Web services, both manually and using ASP.NET. and consume the same in various clients. Sophisticated topics, such as state management, caching and transactions in Web services are covered in Chapter 5. The next four chapters discuss important technologies at the foundation of ASP.NET Web services, including XML serialization, SOAP, WSDL and UDDI. The .NET classes for manipulating WSDL files are explored, and the UDDI .NET SDK is introduced.

The course concludes with an exploration of Web services security and the emerging Microsoft Global XML Web Services Architecture (GXA). The discussion includes the various security issues and technologies in Web services such as Basic HTTP, HTTPS, (SSL 3.0), XML Signature, XML Encryption, XML Key Management Specification (XKMS), Security Assertion Markup Language (SAML) and WS-Security.

Prerequisites

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

Objectives

- Gain a comprehensive understanding of the philosophy and architecture of Web services
- Acquire a working knowledge of creating and consuming Web services using the .NET Framework and Visual Attain a detailed knowledge of the building blocks of Web services, including XML, SOAP, WSDL and UDDI.
- Understand issues in the ASP.NET programming model, such as caching, data handling and state management.
- Attain a comprehensive knowledge of Web services security

System Requirements

Course exercises require Microsoft .NET and Microsoft Visual Studio .NET 2003 on Windows 2000 or XP. Internet Information Services, the SOAP toolkit, and the UDDI .NET SDK should be installed. See the appropriate course Setup Guide for details.

A good minimal hardware profile for this course would have a Pentium 500-MHz or equivalent CPU, 256 MB of RAM, and at least 2 GB of free disk space for tools installation and courseware.

Duration

4 days

Course Contents

1. **What Are Web Services?**
   - Introduction to Distributed Computing
   - Motivation for Web Services
   - Evolving of Web Services
   - Web Services Definition
   - Next Generation of Distributed Computing—Web Services!
   - ASP.NET Web Services
   - Reasons to Embrace Web Services Architecture
   - Benefits of Web Services
   - Backbones of Web Services
   - Alternative to Web Services: .NET Remoting
2. **The Anatomy of Web Services**
   - Creating a Web Service Using ASP.NET
   - Deploying a Web Service Using IIS
   - Testing a Web Service
   - HTTP
   - XML
   - SOAP
   - Web Service Clients
   - SOAP Toolkit Trace Utility
   - WSDL
3. **Developing ASP.NET Web Services**
   - Using VS.NET to Develop ASP.NET Web Services
   - An Overview of the Web Services Namespaces
   - Deriving from the Web Service Class
   - @Webservice Attribute
   - Web Service Class
   - Adding a WebMethod to Web Services
   - Debugging Web Services
4. **Web Service Clients**
   - Web Service Proxies
   - Web Services Description Language Tool (Wsdl.exe)
   - Creating a Proxy with VS.NET
   - Adding Reference
   - Returning Complex User-Defined Data Types
   - Understanding Web Services Clients
   - Developing Console Clients
   - Developing Web Forms Clients
   - Developing Windows Form Clients
5. **ASP.NET Web Services Programming Model**
   - Asynchronous Programming in Web Services
   - Managing State in ASP.NET Web Services
   - Transactions in ASP.NET Web Services
   - Caching in ASP.NET Web Services
6. **XML Serialization**
   - XmlSerializer
   - What Is Not Serialized
   - Writing and Reading XML
   - Customizing XML Serialization
   - XML Schema and XSD
   - Creating Classes from Schemas
   - XML Serialization and Web Services
7. **More About SOAP**
   - The Structure of SOAP Messages
   - Using SOAP Headers
   - SOAP Faults
   - Document and RPC Style Messaging
   - Literal and Encoded Use
   - Customizing SOAP with Attributes
8. **More About WSDL**
   - The Need for Service Description
   - An IDL for Web Services
   - WSDL Namespaces
   - The WSDL Description Model
   - WSDL Descriptors as Schema
   - Message Description
   - Messaging Scenarios
   - Operations: Input, Output, and Fault
   - Messages
   - Service Description
   - Extending WSDL
   - .NET WSDL Classes
   - WSDL First!
9. **Web Service Discovery and UDDI**
   - Publishing and Discovery of Web Services
   - Universal Description, Discovery and Integration
   - UDDI in Visual Studio .NET
   - UDDI Information Model
   - tModels

- Creating a UDDI Description of a Business
- Using the Microsoft UDDI .NET SDK
- Accessing the UDDI Registry

10. Web Services Security and GXA

- Security in Web Services
- Basic Techniques in Securing Web Services
- Secure Connection
- Secure Sockets Layer (SSL) – HTTPs (Secure HTTP)
- Authentication and Authorization for Web Services
- Basic Security for Transmissions over HTTP
- Web Services and Secure Sockets Layer (SSL)
- XML Signature and XML Encryption
- XML Key Management Specification (XKMS)
- Security Assertion Markup Language (SAML)
- Extensible Access Control Markup Language (XACML)
- Need for End-to-End Security
- Global XML Architecture (GXA)
- WS-Security
- Web Service Enhancements (WSE)

Appendix A. Learning Resources

Appendix B. Customized SOAP Messages