

Course 439: Advanced XML and XSLT (4 days)

Course Description...

Advanced XML and XSLT is an intensive hands-on class geared for software developers who need working knowledge of XML and want to expand their knowledge and skills in areas such as XML Schema, XSLT, and, especially, the application of XML.

The course is a balanced mixture of theory and practical labs designed to take students from the basic fundamentals of XML through to the related advanced technologies. The students walk through the different standards in a structured manner to enable them to master the concepts and ideas, which are reinforced in the lab exercises. The course starts with the fundamentals of XML before covering XML Schema in detail. It then moves on to the XPath and XSLT covering advanced topics in both. Finally, XML and Web Services security mechanisms and issues are addressed.

Learning Objectives...

This course provides indoctrination in the practical use of W3C standards (including XSL and XML Schema) and of implementing tools and technologies. This course is programming language independent, making it useful for Java, .NET, C++, and any other programming orientation. Graduates will hit the ground running, applying XML to projects at both an architectural as well as a line by line coding level. We can easily adapt this course to industry and client specific needs.

In addition to valuable knowledge and working examples, students receive a copy of the "Xtensil" product. This unique software was developed to assist in implementing, testing, and fielding XML applications. Xtensil is used as both a teaching aid and a straightforward, basic, fully functional XML toolkit that students can use on Windows and Linux platforms.

Working in a hands-on learning environment student will learn to:

- Design and implement changes to XML Schemas
- Apply advanced XSLT constructs such as calling named templates with parameters
- Use XSLT constructs such as messages, keys, and copy
- Generate linked, dynamic table of contents using XSLT
- Use XML Digital Signature and XML Encryption
- Defend XML-based services and functions from malicious attacks

Who should attend...

This is an **advanced** level XML training course, designed for those needing in-depth knowledge and a working knowledge of XML, XML Schema, XSLT, and XML-related security.

Prerequisites...

A working knowledge of XML is required.



Course Outline...

XML Content

- XML Overview
 - What is XML?
 - History: SGML; HTML
 - XML Author Roles; Tool Roles
 - XML Applications
 - Using XML: When, Where, and Why
- XML Mechanics
 - XML Document Structure
 - Components of XML content
 - Well-Formed and Valid XML Documents
 - Structure, Content and Format

XML Structure

- Structure Using DTDs
 - Document Type Definition (DTD)
 - DOCTYPE Statement
 - Complex Content Models
 - Useful DTD Constructs
 - Designing and Modifying DTDs
- Namespaces
 - Namespaces Associate an Alias with a URI
 - Declaring Namespaces
 - Namespaces Best Practices
- Structure Using Schemas
 - XML Schemas: Objectives
 - Schemas Data Types
 - Complex Types
 - Schema Components
 - Global and Local Components
 - Derived Complex Types
 - Derivation by extension
 - Associating Schemas with XML Instances
 - Using Target Namespaces
 - Using schemaLocation
 - Reuse and Manageability of Schemas
 - Schema Composition
 - Reusable Groups
 - Designing and Modifying Schemas
 - Lifecycle Design Principles for Schemas
 - Managing and Working with Large Schemas

XML Processing

- Parsing XML instances
 - SAX: Event-based
 - Working with SAX Events
 - DOM: Document Object Model
 - Working with DOMs
 - Best Practices for Parsing
- Generating XML
 - Options
 - Best Practices
- Consuming XML
 - Options
 - Best Practices



XML Formatting

- XSL Transformations Review
 - XSL Version Issues
 - XPath Describes Locations Within XML
 - XSLT is Rule-Based Transformation Language
 - XSL is Oriented Towards Formatting
 - XPath Accesses Parts of Document
 - XSLT Templates Specify Output Replacement
 - XSLT Uses XPath Expressions Within Templates
- XSLT and XPath
 - XPath Expressions
 - Abbreviated Axis Forms
 - Predicates As Optional Filters
 - XPath Operators; Functions; Examples
 - Working With XPath
 - o Navigation
 - o Extraction
 - XSLT Stylesheet Structure
 - Templates: Rules in a Stylesheet
 - Apply-Templates Directs Processing
 - value-of to Extract Values
 - Built-in Templates
 - Text Handling
 - Calling Templates
 - Passing Parameters
 - Conditional Processing Constructs
 - Looping With <xsl:for-each>
 - Sorting
 - Constructing A New Node
 - Designing and Implementing XSLT Modifications

Advanced XML Formatting

- XSL FO (Formatting Objects)
 - XSLT Designed to Support XSL-FO
 - XSL Family Working Together
 - XSL-FO Support for Paged Media
 - XSL-FO Document Root Common Overall Structure
 - Define A Page Type
 - Page Types Can Be Conditional
 - Content Flows Into Page Regions
 - Flow Goes to Defined Regions
 - Working With XSL-FO
- Advanced XSL Topics
 - Advanced Features
 - Entities Used For Parameter Sets
 - <xsl:message>
 - generate-id() for Endpoints
 - Create Unique Identifier for Each Node
 - Grouping by Keys Used in Output
 - preceding-sibling:: axis
 - <xsl:key> and key() to Select Groups
 - <xsl:copy-of>
 - <xsl:copy>
 - name()
 - Whitespace and Why We Care
 - Parser Can Perform Whitespace Actions
 - Stripping Whitespace



- Whitespace in Stylesheet
- Whitespace Creep into Output
- Whitespace Coming From Source
- Whitespace Coming From Stylesheet
- Import or Include Statements Compose Stylesheets
- Generating linked TOC

Applying XML

- XML Interoperability
 - XML From a Data Perspective
 - Application Considerations
 - Character Encoding Issues
 - Direct XML Storage
 - Challenges to Mapping XML
 - XML to RDB
 - RDB to XML
- XML Performance Improvements
 - Organization of Best Practices
 - Best Practices Review

Web Services Overview

- Web Services Defined
- XML in Web Services
- SOAP Specification
- WSDL: Description
- UDDI: Publication and Search
- Web Services Enables Decoupling
- Web Services Advantages
- Many Web Services Challenges
- Web Services Interoperability Organization

Ajax Overview

- Ajax Overview
- What is Ajax?
- Ajax Technologies
- Ajax Architecture
- Ajax Flow of Control and Processing

XML and Web Services Security

- XML Digital Signatures
- Standard For Digital Signature
- XML Encryption
- XML Encryption Protects Data
- Securing a Web service
- Web Service Security Exposures
- Transport-Level Security
- When to Use Transport-Level Security
- Message-Level Security
- Web Services Security Roadmap
- SOAP Message Security
- WS-Security Enables Interoperability
- XML Signature and Encryption
- XML Attacks Against Schemas
- XML Attacks Absent Parsers
- XML Injection
- XPath Injection



- CDATA Injection
- Known SOAP and Web Service Attacks
- Web Service Denial of Service Attacks
- OWASP Top Ten
- Picture is Evolving

Wrap-up

- W3C Activities
- Benefits of XML
- Drawbacks of XML
- Data Models in Action
- Data Model Complexity
- Data Model Considerations
- Crossing Boundaries
- Application Architectures
- XML: Lightweight Databases
- Application Integration
- Challenges to Integration
- From Tag to Architecture

Please contact your ROI representative to discuss customizing this course to your unique environment!!!