

TT4400 Integrating XML, Web Services and SOA (for Web Developers) (5 days)



Integrating XML, Web Services and SOA is a five day in-depth course geared for software developers who want to expand their knowledge and skills in areas such as XML, Schema, XSLT, XPath, and Web Services.

This course offers an intensive, hands-on treatment of XML, XPath, XSLT, and web services, providing a balanced mixture of theory and practical labs designed to take students from a quick review of the basic fundamentals of XML through to the related advanced technologies.

► Course Overview

Web Services represent a groundbreaking evolution in distributed computing. The concepts are not altogether new, but the application of them, and the unanimous acceptance of core standards like HTTP, XML, SOAP, WSDL, and UDDI, has paved the way for XML Web Services and service-oriented architecture.

Students will explore 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 a quick review of the fundamentals of XML before covering XML Schema in detail. It then moves on to the XPath and XSLT covering advanced topics in both. The course then examines web services and its various protocols in detail. Finally, XML and Web Services security mechanisms and issues are addressed.

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. This course can be easily adapted to specific industry and client needs.

► Course Objectives: What You'll Learn

Students who attend **Integrating XML, Web Services and SOA** will leave the course armed with the required skills to design, implement, test, and support XML applications and web services. This course provides indoctrination in the practical use of W3C standards (including XSL and XML Schema) and of implementing tools and technologies.

At the conclusion of the course, attendees will be able 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
- Understand and intelligently discuss Web Services and the core

COURSE SNAPSHOT

Duration: 5 days
Focus: XML, XML Schema, XSLT, SOAP, REST, WSDL and related technologies/Course has no backend programming
Targeted Audience: Web Services / Web Developers
Course Format: Extensive Hands-On Programming Labs; Expert lecture combined with open discussions and in-depth demonstrations
Language / Tools: XML, XML Schema, XSLT, SOAP, REST, WSDL and related technologies/Tools provided with courseware
Delivery Format: Available for onsite private classroom presentation, or live online / virtual presentation
Customizable: Yes

- technologies involved
- Read and understand a WSDL document
- Parse, process, and respond to a SOAP message
- Understand the concepts behind REST and a REST-based web service

The course explores the current state of the art of Web services, what works and what doesn't work, and also at newer standards, and how they fit into the Web services picture. Web services are still evolving rapidly, and this course will give you a thorough understanding of the current Web services architecture, and the technologies that support Web services including:

- **SOAP** – Simple Object Access Protocol - A remote invocation (RPC) and messaging mechanism.
- **WSDL** – Web services Description Language – An XML language that describes the interface and semantics of a Web service.
- **UDDI** – Universal Description, Discovery, and Integration – A standard for describing, publishing and finding Web services.
- **REST**- Representational State Transfer - A style of implementing web services that is gaining increasing acceptance and use
- **WS-I** –Web Services Interoperability
- **WS-Security** – Web Services Security

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.

► **Audience & Pre-requisites: Who Should Attend**

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

Previous experience or knowledge of HTML is helpful but not essential.

► **Related Courses – Suggested Learning Path**

Take Before: Students should have basic development skills and a working knowledge in the following topics, or attend these courses as a pre-requisite:

- TT4000 Understanding Internet Architectures

Take Instead: We offer other courses that provide different levels of knowledge or focus:

- If your team needs a high level overview of XML, the **TT4005 Understanding XML** course may be more appropriate.
- For those members of your team that are focusing on using XML and Java, please consider **TT4380 Mastering XML, XSLT, and XSL Using Java (JAXP)**.
- If you need basic XML training and have minimal working knowledge of XML, consider: **TT4300 Core XML Fundamentals (XML, Schema, XPath, and XSLT)**.
- If you need in-depth J2EE web services training but have minimal working knowledge of XML, consider: **TT7360 Mastering XML and Web Services**.

Take After: We offer a variety of introductory through advanced security, development, project management, engineering, architecture and design courses. Students may want to consider the following topics as a follow-on to this course.

- Additional XML & web services topics – Intro through Advanced
- Additional advanced J2EE or Java EE topics
- XML, J2EE, SOA and Web Services Security topics
- Service-Oriented Architecture or SOA Analysis and Design
- AJAX, XML or other Web Development topics
- Java EE topics: EJB3.0; Spring; Hibernate; Design Patterns & more.
- Architecture & Analysis courses

Please note all development courses may also be offered in other programming languages or tailored to suit your unique requirements. Please contact us for recommended next steps tailored to your longer term education, project or development objectives.

► **Experiential Learning: Hands-On Labs**

This class is “technology-centric”, designed to train attendees in essential web services development skills, coupling the most current, effective techniques with the soundest industry practices.

This workshop is about **50% dynamic lab exercises** and **50% lecture**. Throughout the course students will be led through a series of progressively advanced topics, where each topic consists of lecture, group discussion, comprehensive hands-on lab exercises, and lab review. Multiple detailed lab exercises are laced throughout the course, designed to reinforce fundamental skills and concepts learned in the lessons.

At the end of each lesson, developers will be tested with a set of review questions to ensure that he/she has fully understands that topic.

► **Student Materials: What You'll Receive**

Our robust course materials include much more than a simple slideshow presentation handout. Trivera Technologies Student materials include a comprehensive hard-copy course manual, complete with detailed course notes, code samples, diagrams and current reference materials, all directly related to the course at hand, indexed for ease of use. Step-by-step lab instructions and project descriptions are clearly illustrated and commented for maximum learning and ease of use. Our course kits are designed to serve as a useful reference set, long after we leave your classroom.

► **Delivery Environment & LoadNGo™ Classroom Set Up**

Our lab guides are complete with software-specific instructions, screen shots and detailed tutorials for using the software you select. In most cases we can easily port our classes to run in the environment of your choosing.

For course deliveries or virtual presentation using open-source tools, we'll provide our unique **LoadNGo Instant Classroom Kit**, which enables students to run the entire course off of a DVD that hosts the entire course set up software, labs, and other pertinent useful educational resources, whitepapers and more. You only need to provide the hardware and appropriate O/S, and we'll do the rest. No installation needed. **Great for secure environments.** Minimum set up burden for your team or firm, with maximum results for your students.

No matter which set up option or software your firm requires, we're pleased to provide a detailed set up guide for all private or on-site courses, and as much assistance as you require to prepare your students or classroom for the course.

► **Optional Pre-Testing & Assessment**

We work with you to ensure that your resources are well spent. Through our basic pre-testing, we ensure your team is up to the

challenges that this course offers. We will work with you to come up with the best solution to ensure your needs are met, whether we customize the material, or devise a different educational path to prepare for this course.

Please contact us for details about our online pre and post test assessment services, custom managed training plans for one student or your entire organization, and our custom online training program management system for monitoring the courses or progress while skilling your students of all experience levels.

Workshop Topics Covered

Need more info? Please note that a more detailed outline of the course table of contents, lists of lab exercises and project descriptions is available. Please contact us at Training@triveratech.com for info.

Need courseware? This course is fully customizable, and also available for license with complete support for qualified organizations. Please contact Courseware@triveratech.com for details

Session: XML Content Review

- XML Review
 - XML Document Structure
 - Well-Formed and Valid XML Documents
 - Structure, Content and Format

Session: 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

Session: 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
 - 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

Session: 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

Session: Applying XML

- XML Performance Improvements
 - Review of best practices

Session: Path to Useful Web Services

- Services via the Web
- Web Services Overview
- Web Services in Action

Session: Binding: SOAP

- SOAP Overview
- SOAP in Action
- SOAP in Detail

Session: Description: WSDL

- WSDL Overview
- WSDL in Action

Session: REST

- REST Overview
- Principles and Best Practices with REST Web Services
- Publishing and Consuming REST Web Services

Session: Finding Web Services

- UDDI
- Discovery in Action

Session: Security - WS-Security and Defenses

- 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

Session: Wrap-up

- W3C Activities
- Benefits of XML
- Drawbacks of XML
- XML Separates Structure, Content and Format
- Crossing Boundaries
- XML: Lightweight Databases
- From Tag to Architecture

► Why Work With Trivera Technologies?

- **We provide a solid XML and web services web development foundation.** Students will learn how to develop (and reuse!) essential XML and web services development and design skills and concepts properly, using best design practices, grounding them for advanced curriculum. Students will be prepared for designing and implementing real solutions, right after the class ends. Students will learn the importance of developing and maintaining well-designed web services applications.
- **Our courses are focused - no "fluff" included.** We offer more than a "laundry list" approach to teaching. All lessons have clear objectives, are fundamental to core development and design practices, and are reinforced by hands-on labs and solid practical examples. Each lesson has performance driven objectives that ensure students will learn technologies and skills core to fundamental application design – nothing more, nothing less. All labs are take-home, and all solution code is presented in an easy to use self-study format for future use and review.
- **Our materials are comprehensive, and current.** Our comprehensive manuals include not only a hard copy of the course presentation, but also detailed reference notes, pertinent diagrams and charts, current lists of suggested online resources and articles, and often technical tutorials or white papers geared to the topics at hand.
- **We set you up!** Hands-on courses also include our unique materials for each student, complete with our *LoadNGo Instant Classroom* course set up DVD, software, and a multitude of learning resources that complement the course. Run the course right off the DVD – minimal set up for your company – maximum results for your students.
- **True content ownership gives us flexibility & quality above the rest.** These course materials are wholly-owned by our company and fully customizable - at little or no cost - to help you best meet your learning objectives. We have many dedicated experts available worldwide to instruct your team, and can provide services around the globe, either locally or virtually. We work closely with you to produce the most effective events and materials for your team, within your desired timeframe and budget.
- **We have to adhere to higher standards.** As a courseware provider, our content and hands-on lab materials are licensed internationally by dozens of firms, and are therefore subject to very stringent quality requirements. Not only will your organization benefit from our own technical team's technical expertise, but also the feedback of hundreds of students and trainers using these materials, worldwide, on a regular basis. This unique fact guarantees that our materials are not only robust and interesting, but also technically correct, current and of the highest quality and usability.
- **We bring years of practical, current experience into the classroom and content.** Our instructors and course authors are also skilled mentors, Java, J2EE / JavaEE, .Net, SOA, and web services developers, architects and security-oriented professionals. We believe that learning, using and maintaining solid software execution and delivery methods are as important as gaining sharp coding skills. Best Practices

for software development and execution, beyond technical coding skills, are enforced throughout all of our courses and discussions. Our team brings this extensive experience into every classroom and engagement.

- **We're skills-centric.** Although our team has extensive experience using a variety of tools and solutions, our core content is “technology-centric”. Our aim is to teach you the best skills and solutions out there – not to sell you software from any particular vendor.
- **We're Java & J2EE authors and industry speakers.** Our team was selected to write the online *J2EE, EJB, EJB CMP-CMR and Web Services Tutorial Series for IBM developerWorks®* (www.ibm.com) These are the same instructors who train our classes and author the courseware. Most of our trainers/consultants have also authored additional articles on web services, EJB< Struts, J2EE and advanced Java topics, and are recognized speakers and presenters on the industry technical seminar circuit. Our team is comprised on several successful published authors. Members of our team have written or contributed to: *Eclipse Kick Start, Mastering Eclipse; Professional Jakarta Struts; Using Java Tools for Extreme Programming; Mastering Resin; Mastering TomCat and others.*
- **Our services are guaranteed.** Whether you're a stakeholder organizing your firm's educational services, a student in our live or virtual classroom or a trainer using our materials to educate your own client or team – **Our core mission is to make YOU a success in the classroom.**

► **For Additional Information**

Need dedicated training? All courses can be brought onsite for a **private presentation**, customized to suit your unique requirements or goals. Please contact

Training@triveratech.com for course details, Public Schedule dates and locations, and Special Discount Offers.

Need courseware? Let us take the risk out of your classroom delivery! All materials are also available for corporate license with complete instructor support and free corporate branding. We guarantee our pricing and service. Samples of our course materials, as well as live client references for all of our services are available upon request. Please contact Courseware@triveratech.com for details.



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Please contact us for details & pricing.

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