EVOLVED BINARY

Professional Training

The Complete XML Developer

Course Number: DEV-XML-COM-01
Duration: 4 or 5 days[1]

Overview

Evolved Binary's *Complete XML Developer* course is designed to jump-start developers who are new to XML, or to accelerate those developers who have had some basic experience with XML.

Whilst naturally teaching the theory as we progress, the course takes a practical hands-on approach, and we start building real applications and code through various "Laboratory" exercises that build one upon the other, eventually delivering an example application that utilises XML, XPath, XSLT, XQuery, and an XML Database. Our approach not only educates the attendees, but shows them how to locate essential information and guidance in future for further self-development.

Our teachers are both practitioners and highly regarded industry experts, and as such they teach the latest versions of the tools and language standards available, whilst highlighting any backwards compatibility issues with previous versions.

[1] If the attendee already has basic XML expertise, they may skip the first day at a reduced cost. Please discuss your technical expertise with us when booking.

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Prerequisites

All attendees should have basic competency in the operation of a Desktop Computer Environment, File Explorer, Editing Text Files, and use of a Web Browser.

Only those who state they have existing basic XML experience, and who wish to skip the first day, are also expected to have a basic existing understanding of:

- The structure of an XML Document.
- The types of nodes that make up an XML Document.
- Well-formed vs. non-well-formed XML Documents.
- XML Namespaces.
- XML Document Validation, e.g. XML Schema, DTD, etc.

Materials

Training materials will be made available to the participants of the course in both digital and/or printed form as appropriate.

Software Needed on Each Student Computer

Attendees are required to bring a Laptop that can connect to the Internet through (provided) Public Wifi, or through their own private 4G/5G modem. The Laptop must have a modern version of Chrome, Chromium, Firefox, or Safari installed.

We will provide access to a cloud environment for students to use for all course exercises. Access to the Cloud Environment will be through the Web Browser of the attendee's Laptop computer.

Course Objectives

1. Gain a thorough understanding of XML Documents and the XML family of languages and tools.
2. Master the fundamentals of the XPath Language.
3. Learn XSLT to transform documents, and extend your use of XPath within XSLT.

4. Learn XQuery to query and update documents, and extend your use of XPath within XQuery.
5. Gain a practical understanding of XML Databases, and how to operate an XML database (eXist-db).
6. Combine XQuery and XSLT to query and transform documents.
7. Build a Web Application that utilises XML, XPath, XSLT, XQuery, and an XML Database to search, transform, and update XML documents.

Course Outline

The course is split into 5 days. The first day is for beginners, and may be skipped by those that have appropriate previous XML experience.

Day 1 - Introduction to XML

- Introduction
    - XML and Markup languages
    - XML Uses and Strengths
- XML Syntax
    - Nodes and Trees
    - XML Entities
    - Well-formedness
    - Namespaces
- Validation and Schemas
    - Schema Languages
    - Schema Association
    - XML Catalogs
    - Schema Aware Editing
- Data Model Overviews
    - JATS
    - HTML and XHTML
    - DTD Overview

Day 2 - XPath

- Introduction
    - XPath Data Model (Nodes, and Atomic Types)
        - Including: Maps and Arrays
    - XPath Statements
    - Absolute and Relative XPaths
    - Element Values
- Anatomy of an XPath
    - XPath Axes
    - Node Kind Tests
    - Abbreviations and Wildcards
    - XPath Predicates
    - Simple Operators
    - XPath Comments
- XPath Sequences
- Standard XPath Function Library
    - Introduction
    - number(), count(), sum(), and avg() Functions
    - Formatting Numbers
- String Handling in XPath
    - Concatenation and sub-strings
    - Space Normalization
    - Regular Expressions in XPath
    - tokenize(), analyze-string(), and the string-join() Functions
- XPath Flow control
    - `if` Operator
    - `for`, and `let` Operators
    - Constructing Sequences with the `to` Operator
    - Choosing Distinct Values
    - Existence and Emptiness

- XPath Advanced Operators
    - Except
    - Intersect and Union
    - Quantified Expressions
    - Ordering
    - Identity
    - The Bang Operator
    - The Arrow Operator
    - Type Tests
- Anonymous/Inline Functions

Day 3 - XSLT

- Introduction
    - Push vs Pull Processing
    - Template Matching
    - The XSLT Processor
    - Built-in Templates
    - Copying Nodes
- XSLT Unit Testing
    - The Reasons for Testing
    - TDD and BDD Testing
    - Using XSpec
- Conditional Content Construction
    - on-empty, on-non-empty, and where-populated
    - Computed Elements and Attributes
    - Text and Attribute Value Templates
- Parameters and Sequences in XSLT
    - Parameters, and Tunnel Parameters
    - Constraining Types Using `as`
    - XSLT Sequences
    - Sorting
- Modes, Modularity and Priority
    - Modes
    - Modules
    - Template Priority
    - next-match

- External Files
    - Working with External XML Documents using the doc(), doc-available(), and collection() Functions
    - Working with External Text Files using the unparsed-text(), unparsed-text-lines(), and unparsed-text-available() Functions
    - Serialisation
    - Multiple File Outputs

Day 4 - Morning - Further XSLT

- Grouping and Keys
    - Grouping using for-each-group
    - Keys
- Reusable XSLT Components
    - Custom Functions
    - Named Templates
- XSLT FLow Control
    - Accumulators
    - Iterate
    - Errors
    - If and choose/when Statements
    - for-each Statements

Day 4 - Afternoon - Introduction to XML Databases

- Understanding XML Databases
    - Use-cases for an XML Database
    - Types of Database and XML Database
    - How XML Databases Store XML Documents
    - Functions and Features of an XML Database
    - XML Database products, and How to Choose One
- Getting started with eXist-db (an XML Database)
    - Obtaining and Setting Up
    - Overview of eXist-db
    - Managing Documents and Collections
    - Understanding eXist-db's Permissions System
    - Managing Users and Groups
    - Managing Document and Collection Permissions
- Accessing and Retrieving Data from eXist-db
    - eXist-db Tools (eXide, JAC, Monex, etc)
    - WebDAV, XML-RPC, and Oxygen XML Editor
    - HTTP REST Interface
    - Dynamic XSLT Rendering from the Database

Day 5 - XQuery and Building XML Applications

- Introduction
- XQuery and the XML Ecosystem
    - How XQuery fits with XPath, and XSLT
    - XQuery Processor Model
- Running Basic XQuery with eXist-db
- FLWOR Statements
    - For Clauses
    - Let Clauses
    - Where Clauses
    - Order by Clauses
- Grouping in XQuery
    - Grouping in XQuery 1.0
    - Group by Clause
    - Complex Grouping

- Running XQuery Against Documents Stored in eXist-db
    - Serving HTML Web Pages via XSLT from XQuery
- XQuery Modules
    - Overview
    - User Defined Functions
    - Main vs. Library Modules
    - Importing XQuery Library Modules
    - Writing Modules
- XQuery Annotations
    - Syntax
    - Common Use Cases
    - Writing Annotations
    - Accessing Annotations using XQuery
- Testing XQuery
    - Explicit Typing
    - XQuery Testing Frameworks
    - XSpec for XQuery
    - XQSuite for XQuery
- Building a Web Application with XML
    - What is XRX?
    - XHTML Serialisation
    - eXist-db's Request and Response Modules
    - Processing Forms
    - Full Text Queries
    - URL Rewriting
    - eXist-db's Session Module
    - User Authentication and Login
- Query Performance in eXist-db
    - Monex
    - Configuring Database Indexes
    - eXist-db Range Indexes
    - eXist-db Full Text Indexes
    - eXist-db Facets and Fields
- Sending Email Notifications from XQuery
- Querying SQL Databases from XQuery
- RESTXQ for Web APIs
- Updating XML Documents and Collections with XQuery Update

Further Information

Alongside our scheduled training courses in XML, XSLT, XQuery, Schema, OWL, RDF, SPARQL, and Java, we can also design bespoke training courses specifically for your organisation's needs.

For further information please visit our training website https://www.evolvedbinary.com, or to discuss your training needs with us please telephone or email:

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