

Event Report

Report author:	Toby White
Event organiser(s):	Toby White, Andrew Walker
Title of event:	Integrating Fortran and XML
Date of event:	28/1/2008-30/1/2008: 3 days
Target Audience:	Scientific Fortran programmers wishing to take advantage of XML (eXtensible Markup Language) data management technologies

Objectives:

- * Introduce delegates to XML technology stack
- * Give broad overview of how to navigate the XML landscape.
- * Convey understanding of how XML can help the computational scientist.
- * Teach delegates how to generate and consume XML directly within their existing Fortran codes.

Chronology of Event:

"Introduction to XML: Syntax and Concepts"

- Toby White

Overview of XML's history; an explanation of the underlying model for data encoding, and an introduction to its syntax.

Practical I: Creating XML from Simple Fortran Programs:

- Andrew Walker & Toby White

We introduce delegates to the Fortran XML toolkit, its compilation and installation. We show how to use it to generate XML output from simple programs.

" XML Languages: From Syntax to Semantics"

- Toby White

XML *per se* is a construction kit for building data languages. In order to apply XML to a particular domain, you need to choose what languages you are going to use. We give an overview of the considerations that may affect the choice of language, and give some useful examples.

Practical II: Adding XML Output to Existing Fortran Applications

- Andrew Walker & Toby White

We take an existing scientific Fortran code, and integrate the Fortran XML toolkit. We use it to directly generate XML output that can be visualized within Google Earth.

"The XML Landscape: Beyond the basics"

- Toby White

The XML standard alone is only a small part of what makes XML useful. There is a plethora of related standards, and of toolkits and interfaces that build upon XML itself. Here we walk through the landscape of XML standards, and highlight how and when they might be useful in typical scientific workflows.

Practical III: Extracting Data with XPath

- Andrew Walker & Toby White

We introduce delegates to the XPath data extraction language. We teach its use through a series of simple examples, culminating in writing a short data analysis program which consumes the results of the previous practical.

"Accessing XML data from Fortran: SAX, DOM, and Beyond"

- Toby White

SAX and DOM are two common interfaces for accessing XML data. We explain their underlying concepts, and illustrate how they may be used within a Fortran context. We explain how and where existing XML interfaces fall short, and where research is ongoing in building "semantic" data extraction toolkits, and give pointers on exploring further work.

Practical IV: Reading XML Data into a Scientific Application

- Andrew Walker & Toby White

We teach delegates how to use the Fortran DOM interface to extract data from an XML file. A series of short examples demonstrate the functions and subroutines necessary to manipulate XML data files, and perform a scientific calculation based on their contents.

(All the presentations for these are already available on the eSI website at: <http://www.nesc.ac.uk/action/esi/contribution.cfm?Title=841>)

Event Achievements:

The feedback forms were almost universally very positive. The delegates came away with a greatly improved understanding, both of XML and related technologies, and of the role that they can play in a working computational scientist's life. Furthermore, through the practical exercises, they are well-equipped to directly make use of those lessons.

I've since corresponded with several of the delegates, advising them on the use of XML in their work. With my permission, some of them have taken the course materials and distributed them further within their own organizations.

Any Other Observations:
