



W H I T E P A P E R

Unlocking the Value of Financial Research with XML

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Introduction

PolarLake is an XML based integration system. As discussed below, the adoption of XML for Equity Research is forecast to grow because of the combined benefits of adhering to compliance regulations, reduced cost and improved client services. As Equity Research departments re engineer their systems to support these new message formats, they will be faced by the need to integrate the XML into existing systems, such as authoring, compliance, and the publication mechanisms out to clients. As business areas in other parts of banking have found, this is a task that requires a specialist XML integration engine, namely PolarLake.

The functionality provided by the PolarLake software system allows it to:

- Interfaces into the existing authoring system
- Optionally provides automated compliance checks of the authored reports
- Delivers the underlying reports out to clients, distributors and sales teams
- Automates the tailoring of reports for key clients, and
- Can receive and deliver ad hoc requests from (buy side) clients

The Challenge: Managing Cost and Risk

RIXML.org, an industry consortium that has defined an XML schema standard, called RIXML, for financial research and spans both buy and sell sides in the financial services industries, estimates that there are over 800,000 research reports and 90,000 research notes published annually. This puts a huge cost burden on the sell-side, which must author each report, pass it through review processes and compliance prior to publication.

Compliance has become a major concern in the wake of the introduction of NASD 2711 and revisions of NYSE Rule 472, which both govern conflict of interest and objectivity of research. The sell-side challenge is to control the costs and to gain the maximum benefit from these reports by reusing the content in many ways and delivering the content to best effect. Reuse of the content requires search, sorting and aggregation support. Delivery requires

personalization of information to each client's requirements. Finally, the buy-side challenge is to efficiently handle the mass of information, and deliver it internally, potentially personalised further by the buy-side's own search, sort and aggregation criteria.

The Benefits of Adopting XML

The size of the opportunity has been recently measured in an Accenture report which states that banks and brokerages could save between \$50m – \$100m annually by employing XML based standards to their research efforts. It also stated that Tier One banks with 5 per cent market share stand to gain as much as \$35m in cost benefits, \$60m in productivity benefits and between \$200 – \$400m in revenue benefits by modernising their systems.

The benefits that derive from adopting XML relate primarily to the potential for significant improvements in the automated creation of new reports from existing research (such as aggregation, sorting and searching across reports) and the associated enhanced opportunity for personalisation of research to the needs of individual clients. This is because XML supports the breaking up into granular parts, or **componentization**, of the research information into discrete units that can be combined and recombined into these many different formats. The value to the business this delivers is that of differentiating the service from competitors provided through the creation of tailored content and formats and enhanced on-demand searching, sorting and aggregation across reports.

Given the potential benefits, it was not surprising to see the adoption of XML starting to gain momentum in financial research with a number of large financial service providers on the sell side committed to encoding their research in XML. From the end of 2002, there have been a number of announcements by firms focused on distributing the information from sell side to buy side, such as Thomson Financials and Bloomberg. However, the adoption of RIXML has not been restricted to the distributors only. For instance, Wachovia announced that it would be publishing and supplying RIXML encoded research to its clients directly. Wachovia stated that the move to RIXML allowed it to build a closer relationship with its clients through the provision of better research.

PolarLake's Proposition

As stated in the Introduction, the majority of financial organisations have discovered to their cost that the integration of XML is a non trivial task that requires a specialist XML integration engine. It is common for organizations to approach this requirement in one of two ways, either develop lines and lines of code or use existing middleware systems currently in place in the bank.

Both options typically fall short of expectations and requirements, and what results are high costs, short cuts, workarounds, failure to meet the business timescales and a high cost of ownership supporting the running system. PolarLake has the potential to address each one of these issues.

The PolarLake software products address key areas for organisations on the sell side that are migrating to RIXML, or an in house equivalent:

- Automation of compliance checking
- Publication and personalization of reports
- Search and aggregation of research information
- Distribution and storage of information

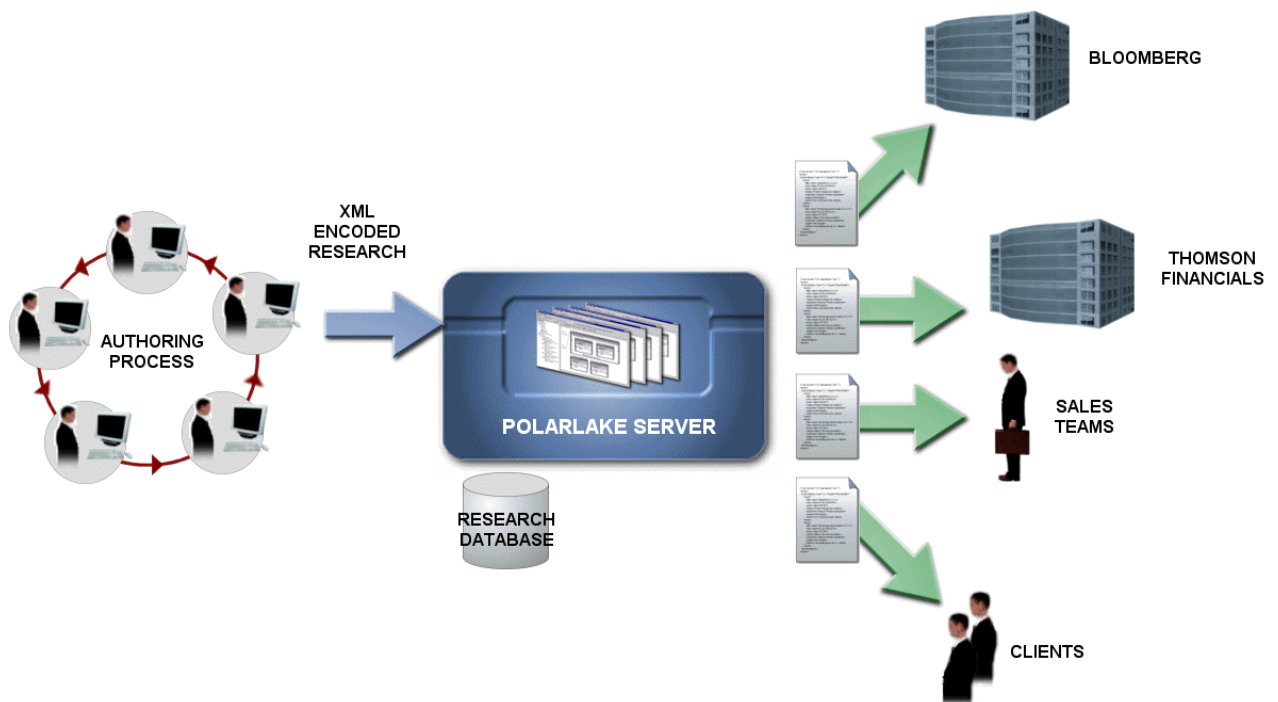


Figure 1 The PolarLake solution integrates with the authoring process and delivers publication and personalisation services.

Guide to the White Paper

This paper provides an overview of the benefits and challenges for firms on the sell side wishing to implement XML-based systems, including those based on the RIXML standard and explores how PolarLake can be used to address these challenges.

The Benefits of Adopting XML

XML has benefits for buy and sell side firms. For the sell side, XML can contribute in the following ways:

- Reduces the cost associated with publication and management of the research information.
- Reduces risk and cost associated with adding and verifying the required disclosure statements. The scale of the risk can be seen in on-going regulatory action against firms over the last two years that have resulted in large fines and the new rules governing conflicts of interest.
- Allows greater value to be extracted from the complete set of research, by facilitating aggregation and cross-referencing.
- Improves the value of the service delivered to key clients, by allowing personalisation of content, and subsequent delivery.

For the buy side, XML increases the value derived from research reports by greatly enhancing searching, sorting and aggregation across reports and sources, as well as personalization to match each fund manager's portfolio and focus areas. As more and more of the financial services industry moves to XML-related standards, it also becomes possible to enhance decision making by integrating research information with other types of information, such as news feeds, or information from any back-end system, such as risk management systems.

PolarLake: The XML Integration Platform

PolarLake provides solutions for the financial services industry that are focused on the integration and processing of any XML-based documents without sacrificing reliability, performance and scalability.

PolarLake's products are based upon:

- Technology integration with PolarLake's Dynamic XML Runtime™, which provides a highly scalable, high performance runtime server that integrates with existing enterprise infrastructure such as queuing systems, management infrastructure and legacy applications.
- Business integration with PolarLake's data-centric XML Circuits™ approach, which allows developers and business users to rapidly deliver new solutions with minimum disruption to existing systems and maximum use of existing systems and skills.

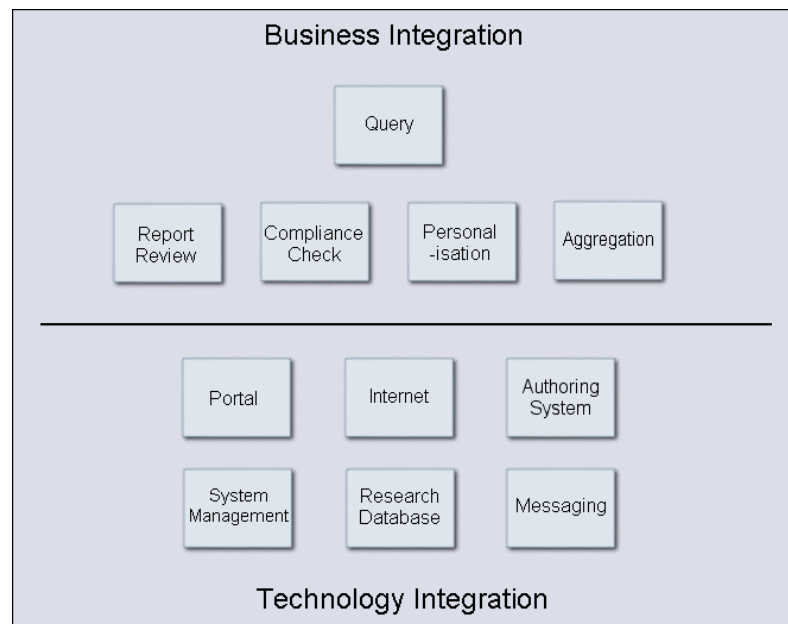


Figure 2 Technology and business integration.

PolarLake's products are deployed in the financial services industry worldwide, integrating applications and automating mission-critical processes relating to billions of dollars of financial transactions.

For the companies publishing or consuming research information, the PolarLake product set provides the ideal platform for building a range of solutions for both buy side and sell side.

The Role of XML & PolarLake on the Sell Side

The publication of research reports can be seen as a four step process:

- Authoring/Review: Creation of the research by the analysts
- Compliance Checking: Verification that the research complies to regulatory and internal controls
- Creation of standard and personalized formats: Generation of formatted reports, standard aggregated reports and ad hoc reports for clients
- Publication: Delivery of the reports.

Of these four steps, Compliance Checking is crucial in controlling risk and ensuring compliance with regulation.

Personalisation of content and automating querying and aggregation in the PolarLake solution, is key to controlling costs and increasing the value of the research. Automating the production of new reports from existing research (such as aggregation, sorting and searching across reports) providing personalised reports for individual clients. Publication of both the vanilla and personalized reports requires the formatting of information and delivery to the correct channels, typically to information distributors such as Thomson Financials, or direct to internal sales teams and key clients.

To cover each of the four steps in a little more detail:

1. **Authoring and Review**

For XML to be adopted by analysts, authoring and reviewing of documents must not put an excessive burden on their time or require excessive retraining. The authoring solution should match as closely as possible their existing habits and tools, but add the ability to generate XML formatted documents. The authoring solution also needs to either include or integrate with a simple workflow tool to allow the review and approval cycle to be completed. PolarLake works with existing authoring systems to facilitate the later stages of the process.

NOTE: For the authoring process, PolarLake is familiar with Evolution's Clarity solution, which uses Microsoft® Word to create accurate, compliant and modular research documents.

2. Compliance

After the review cycle, a final stage must be completed prior to publication: compliance, which is the inclusion of appropriate disclosures based on the sell-side firm's current or previous recommendations, positions and financial relationship with the subject of the research report. This task can be broken into three parts:

- Integration with the authoring, publication and storage systems.
- Gathering of the appropriate information, based on the content of the report.
- Annotation of the report with this information in the approved format.

The above functions are available fully automated in some authoring solutions. Where they are not and intensive manual intervention is required, then PolarLake provides an automated solution.

3. Formatting and Personalization

XML provides an opportunity to automate the creation of standard report formats, and standard aggregations of research information and hence make significant cost savings. Furthermore, XML can also be used to automate the creation of tailored reports from existing research information, based on queries or ad hoc requests from clients.

XML-formatted reports are naturally structured into **components** of the research information, corresponding to recommendations, financial information and so forth. It becomes easy to search across multiple reports for components and combine them into many different formats, corresponding to daily overviews, sectorial analysis or ad hoc reports generated for clients. These reports are expensive to generate manually. By automating this step, the current costs can be significantly reduced. The value extracted from a single piece of research can also be greatly increased because it allows the sell-side to rapidly create research products that differentiate its services from those of competitors.

One of the business drivers for investment in XML based solutions is to improve the value of the service for the client by removing the need to issue 100's of pages of reports where the client is only interested in a small part of it. This requires personalizing the generated research. If XML is already in use, then a popular but cumbersome and manually intensive method is using stylesheets. PolarLake provides a more intuitive and less manually intensive method, using the PolarLake mapping engine. A fully graphical screen based module, it enables business developers to define the exact personalizations by drag and drop techniques. A screen shot is below.

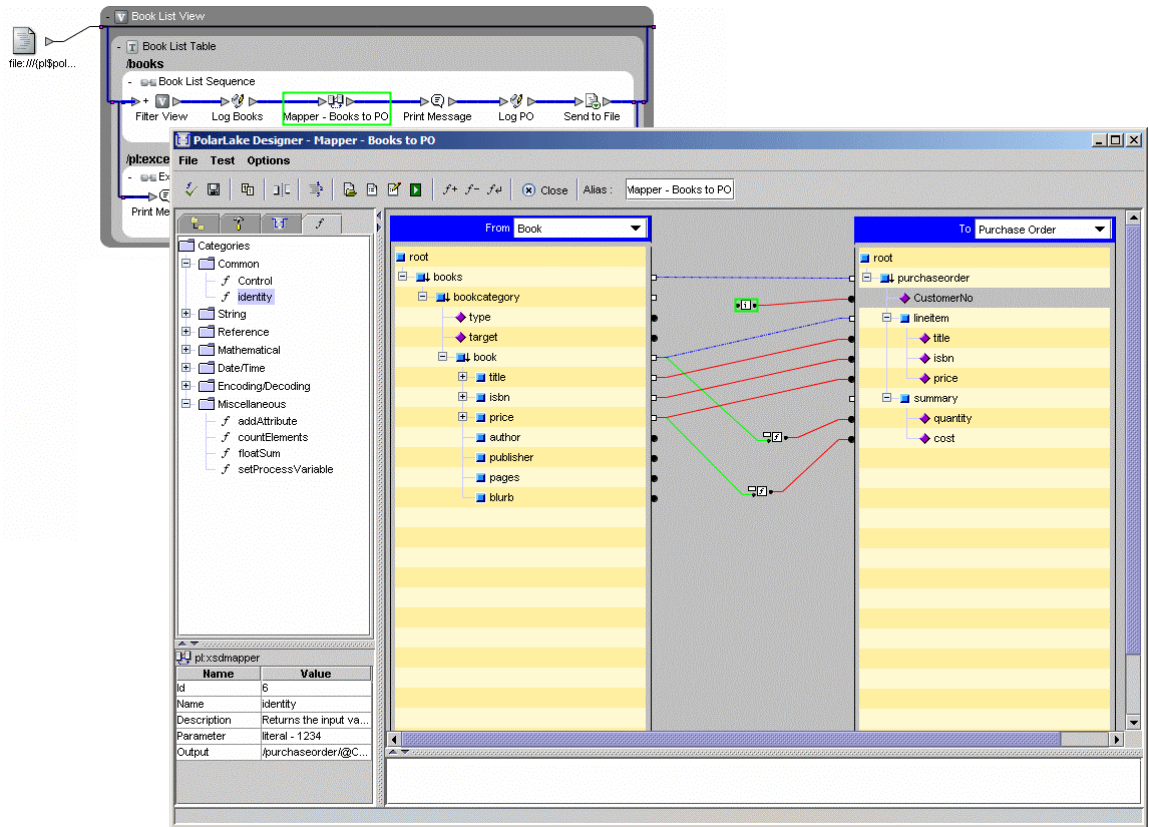


Figure 3 The PolarLake mapping engine for defining personalized client reports.

Aggregation is also supported across multiple reports, again within the context of publish/subscribe, content-based routing or active querying. The above business development software is used to define these.

Finally, active querying of the published research is also supported by the PolarLake solution, whereby clients can query the research databases. For example a fund management company can define the criteria of the research report they would like to receive, for example an aggregated report of all petrochemicals research that are a strong buy over the last 2 years. The request can be sent over the internet and received by PolarLake. On receipt of the request,

PolarLake will interrogate the research database store, extract the relevant data, wrap it up as an XML document, and return in to the buy side client in whichever format is required, eg raw XML, pdf etc...

4. Publication

PolarLake allows content to be delivered to fund managers via email, Internet browsers or into buy-side research databases.

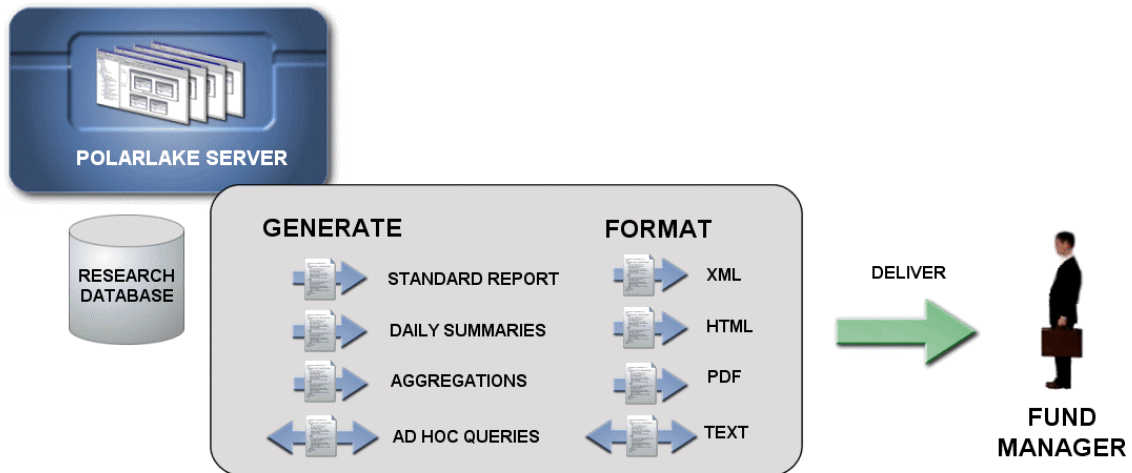


Figure 4 PolarLake supports sophisticated personalization and ad hoc queries across multiple delivery channels.

The PolarLake solution has a number of additional benefits that makes adoption easier:

- It is capable of supporting any format such as those required by existing distribution channels, such as Thomson Financials and Bloomberg, those specified by large clients as well as any new formats that may emerge in the future.
- The PolarLake products do not require any installation on the client side. Instead the solution can send in any format (XML or otherwise) across a range of delivery technologies including email, internet protocols and messaging oriented middleware systems such as IBM® WebSphere®.
- By working over multiple delivery technologies, PolarLake's products allow existing investments to be used and can support any of the qualities of service provided by these transports (such as guaranteed delivery).

Conclusions

There are a combination of business pressures on the equity research areas are of sell side financial institutions: compliance, cost reduction and the pressure to make the research they produce of more value to the clients they serve.

XML / RIXML can provide sell side firms the means to address each one of the above.

PolarLake facilitates this by providing a systems integration layer based on XML, upon which the improvements can be delivered.

Key areas include:

- Compliance, by automating information gathering from back-end systems and automating the annotation of reports.
- Formatting and Personalization of new and existing research including aggregation, cross-referencing and arbitrary queries.
- Publication of research with support for personalised delivery across multiple delivery channels

Because it integrates into existing IT investments, such as authoring systems and middleware, a PolarLake solution can be deployed with the minimum disruption to the business at much reduced risk and cost.

In conclusion, if you are considering the adoption or extension of the use of XML in equity research, you should consider what PolarLake can do to help.

Appendix: The eXtensible Markup Language (XML)

XML is a markup language that is similar to HTML, the language used in Web browsers, and is becoming commonly used to facilitate interchange and processing of data between computer systems. Gartner has predicted that by 2005, XML, standardized by the World Wide Web Consortium (W3C) in 1998, will have emerged as the common language of electronic commerce. XML-related standards are being progressed by a number of organizations. These standards don't provide a complete architecture for encoding financial information, but rather focus on specific sub-sections of the Financial Services industry or particular vertical niches. Each of the organizations is creating frameworks for defining XML documents in its area of focus, and in some cases rules for how the documents should be exchanged. The frameworks are typically described as architectures.

Part of the power of XML is that it is readily understandable by people as well as machines. The structure of an XML representation of information is hierarchical, consisting of a series of elements, each defined by a start tag and a matching end tag. For example, a famous address can be described in XML by:

```
<?xml version="1.0"?>
<Address>
  <Number>1600</Number>
  <Street>Pennsylvania Avenue NW</Street>
  <City>Washington, DC</City>
</Address>
```

Element tags are enclosed in angle brackets ('<', '>') and each begin tag must have a matching end tag. The term 'document' is used to describe any

collection of XML, whether it corresponds to a human readable business document or a SWIFT message.

<Address>

<Number>1600</Number>

<Street city="Washington" state="DC">Pennsylvania

Avenue NW </Street>

</Address>

These definitions are normally in the form of XML DTDs or Schemas, which describe the structure and sequence of each conversation. In most cases, the definitions are not Web services-based, reflecting the messaging-oriented nature of much financial services interaction.

While some convergence between the standards is likely, it is probable that any finance organization will need to support multiple standards within its systems, and any architecture must be flexible enough to manage the evolution of these standards. Gartner sums this up well when it predicts that 'Through year-end 2005, the majority of large financial services providers will support multiple XML-based data model standards to connect with their external stakeholders.'

This requirement to coexist with multiple standards must be achieved without significant performance, latency or maintenance overhead, all of which would undermine the typical project goal of real-time response. PolarLake recognizes this and its products support all the emerging schema standards, so systems developed with PolarLake can be easily modified to handle a new XML document type or XML schema standard with minimal cost and disruption to the existing solution.

RIXML: The Financial Research Standard

RIXML is an XML schema defined by RIXML.org to define XML documents containing research information. This section includes extracts from the RIXML standard, which is copyright of RIXML.org.

To give a flavour of the standard and the way it defines research documents. Full information is available on the RIXML.org website, as well as information about the way the standard will continue to evolve.

The standard defines the types of information that is required within any research report, such as the Recommendation element that can take any value from the following set:

```
<xsd:simpleType name="RecommendationActionEnum">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Upgrade" />
    <xsd:enumeration value="Reiterate" />
    <xsd:enumeration value="Downgrade" />
    <xsd:enumeration value="Initiate" />
    <xsd:enumeration value="Drop" />
    <xsd:enumeration value="Revise" />
    <xsd:enumeration value="NewRating" />
    <xsd:enumeration value="Affirmed" />
    <xsd:enumeration value="PositiveOutlook" />
    <xsd:enumeration value="NegativeOutlook" />
    <xsd:enumeration value="ReviewForUpgrade" />
    <xsd:enumeration value="ReviewForDowngrade" />
    <xsd:enumeration value="ReviewDirectionUncertain" />
    <xsd:enumeration value="RatingWithdrawn" />
  </xsd:restriction>
</xsd:simpleType>
...
```

From this set of definitions, the research documents are built up. For instance, the following fragment shows the first section of a product definition:

```
<xsd:element name="Product">
  <xsd:annotation>
    <xsd:documentation>Product refers to a unique "research idea", as
    opposed to an actual research publication. It is possible to publish multiple
    documents or other files (called "resources") with the same productID, provided
    they all refer to the same discrete research idea. Examples of a product include a
    research note, research report, conference call webcast, and morning meeting
    compilation. Examples of multiple resources published with the same productID
    are (1) a document published in English, with exact translations in German,
    French, and Japanese, (2) an audio file of a presentation and the transcript of the
    publication or (3) a single report that consists of a PDF and an
    Excelfile.</xsd:documentation>
  </xsd:annotation>
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element ref="rixml:StatusInfo" minOccurs="1"
maxOccurs="unbounded" />
      <xsd:element ref="rixml:RelatedProduct" minOccurs="0"
maxOccurs="unbounded" />
    ...
  </xsd:complexType>
</xsd:element>
```

There are several points to note in this sample: The RIXML.org standards include lots of annotations (including in the **xsd.documentation** element) which makes it easy for anybody with basic knowledge of XML and schemas to work out how to build a document. Within the product element, there are elements such as **rixml:StatusInfo** which must occur at least once, by others such as **rixml:RelatedProduct** which are optional and do not have to occur. This allows for the variety of different information included in different types of report, within a single schema definition.

PolarLake

PolarLake™, a leader in standards based incremental integration, is driving out the costs of integration. PolarLake provides a complete suite of products for implementing XML and Web Services-based solutions, including those based on the Enterprise Service Bus architecture. PolarLake's products deliver rapid Return on Investment by focusing on solving high value business problems with a standards based approach capable of evolving and expanding to address the longer term objectives of the organization.

PolarLake has a proven track record in delivering the benefits of incremental integration with a technology that leverages existing IT investments in standards, skills and systems to reduce both initial investment and total cost of ownership. Deployed customers include leading corporations in financial services such as Pioneer Investments* (Ireland), Man Financial Ltd (UK), and Nissay Dowa (Japan), in Government, such as CJIT (Criminal Justice IT, UK), and in telecommunications such as Midwest Wireless (USA) and KDDI (Japan).

PolarLake's solutions are provided by partners such as Hitachi Systems and Services and Sun Microsystems. PolarLake is a private company, headquartered in Dublin, Ireland, with offices in London, New York and Tokyo.

Leveraging its unique Dynamic XML Runtime™ technology and XML Circuits™ application assembly framework, PolarLake's products allow customers to deliver solutions at a fraction of the normal time and cost.

While addressing different requirements, each of PolarLake's products delivers:

Technology integration with PolarLake's Dynamic XML Runtime™, which provides a highly scalable, high performance runtime server that integrates with enterprise infrastructure such as queuing systems, management infrastructure and legacy applications.

Business integration with PolarLake's data-centric XML Circuits™ approach, which allows developers and business users to rapidly deliver new solutions with minimum disruption to existing systems and maximum leverage of existing assets and skills.

Unique tools that leverage existing skills to provide an intuitive XML-centric environment, and which support the software life cycle and are based exclusively on open standards.

*Pioneer Investments is a trading name of the Pioneer Global Asset Management S.p.A. group of companies.

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