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# How and Where XML is Changing the Markets

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**Sample Only**

# Introduction

- » **XML** is making clear inroads in engaging the financial world
- » Early progress on financial XML specifications has been in particular vertical areas
- » No broad horizontal solution for encoding financial information is yet in place
- » We will examine the available XML specifications for finance, and how they fit into the bigger picture of financial information usage.



# Introduction

- » Compared to printed version, these slides leave out a lot of the details, but are more up-to-date

## Introduction : DTDs, Schemas, & schemata

- » **DTDs**, XML Schemas, etc. will be collectively referred to in this presentation as **schemata** (i.e. all in lower case — one **schema**, two **schemata**, etc.).



## Introduction : Standards

- » While one often talks colloquially of XML **standards**, there is only a handful of international bodies which can legally issue a standard
- » The term **specification** will be used to indicate an XML schema that is an **industry standard** or a **de facto standard**, rather than a legally binding standard.

# XML Specifications for Finance

- » The XML specifications covered in this presentation will be broadly classified as **view** (informational), **do** (transactional), or both:
- » **FpML** (Financial Products Markup Language) [do]
- » **XBRL** (eXtensible Business Reporting Language) [view]
- » **MDDL** (Market Data Definition Language) [view]
- » **ISO 15022** [view, do]
- » **swiftML** [view, do]



# XML Specifications for Finance

- » **FIXML** (Financial Information Exchange Markup Language) [do]
- » **IRML** (Investment Research Markup Language) [view]
- » **RIXML** (Research Information eXchange Markup Language) [view]
- » **FinXML** [do]
- » **NewsML** [view]
- » **MarketsML** [view, do]
- » **ebXML** [do]

# FpML

- » FpML, the **Financial Products Markup Language**, is initially focussing on **over-the-counter** financial instruments
- » **OTC** products are not exchange-traded, but traded directly between two financial institutions, e.g. banks.
- » Traditionally, OTC deals agreed by telephone; only most important details discussed
- » Each party faxes and couriers the full details to the other



# FpML

- » Details are then compared to make sure that both parties are agreeing to same thing
- » Time pressures mean full details cannot be agreed during the telephone phase
- » Process of **confirmation**, comparing what each party intends to agree to, is manually tedious
- » Good candidate for automation using XML

# FpML

- » FpML messages each have a known and predefined set of defaults, each of which can then be overridden
- » This makes the process of **not explicitly specifying something** well-defined
- » FpML 1.0 covers **interest rate swaps** and **forward rate agreements**
- » Proposals to extend this to **equity derivatives**, **FX** (Foreign eXchange) **spots**, **FX forwards**, **FX swaps**, **non-deliverable forwards (NDF)**, **simple FX options** and **FX option strategies**



# FpML

- » Exchange-based transactions, such as "sell 1000 Reuters shares on the **LSE** (**London Stock Exchange**) for no less than £20 per share", are currently out of scope

## FpML : Architecture

- » In FpML, there is a separate architecture document that describes the rules for creating FpML DTDs and XML Schemas
- » Allows FpML product DTDs and Schemas to be created with a consistent **look and feel**, without time wasted on fruitless discussions about elements vs. attributes, etc.
- » FpML is interesting in that **elements are used in preference to attributes**
- » Only attributes are a few special FpML-specific global attributes



## FpML : Architecture

- » In FpML 1.0, only DTDs are supported
- » XML Schemas will be supported once Schema validators have complete coverage and give consistent results
- » If you are interested in XML architecture, read the FpML 1.0 Architecture Trial Recommendation
- » **Not** FpML-specific, and a good example of how to separate architecture issues from concrete product issues

# FpML

- » FpML 1.0 was released on the 14th May, 2001
- » Work on FpML 2.0 is well under way
- » Following snippets are taken from the FpML 1.0 Recommendation:



# FpML : Samples

[-] ♦ FpML	(trade)
♦ version =	1-0
♦ businessCenterSchemeDefault =	<a href="http://www.fpml.org/spec/2000/business-center-1-0">http://www.fpml.org/spec/2000/business-center-1-0</a>
♦ businessDayConventionScheme...	<a href="http://www.fpml.org/spec/2000/business-day-convention-1-0">http://www.fpml.org/spec/2000/business-day-convention-1-0</a>
♦ currencySchemeDefault =	<a href="http://www.fpml.org/ext/iso4217">http://www.fpml.org/ext/iso4217</a>
♦ dateRelativeToSchemeDefault =	<a href="http://www.fpml.org/spec/2001/date-relative-to-1-0">http://www.fpml.org/spec/2001/date-relative-to-1-0</a>
♦ dayCountFractionSchemeDefaul...	<a href="http://www.fpml.org/spec/2000/day-count-fraction-1-0">http://www.fpml.org/spec/2000/day-count-fraction-1-0</a>
♦ dayTypeSchemeDefault =	<a href="http://www.fpml.org/spec/2000/day-type-1-0">http://www.fpml.org/spec/2000/day-type-1-0</a>
♦ floatingRateIndexSchemeDefault =	<a href="http://www.fpml.org/ext/isda-1991-definitions">http://www.fpml.org/ext/isda-1991-definitions</a>
♦ partyIdSchemeDefault =	<a href="http://www.fpml.org/ext/iso9362">http://www.fpml.org/ext/iso9362</a>
♦ payRelativeToSchemeDefault =	<a href="http://www.fpml.org/spec/2000/pay-relative-to-1-0">http://www.fpml.org/spec/2000/pay-relative-to-1-0</a>
♦ periodSchemeDefault =	<a href="http://www.fpml.org/spec/2000/period-1-0">http://www.fpml.org/spec/2000/period-1-0</a>
♦ resetRelativeToSchemeDefault =	<a href="http://www.fpml.org/spec/2000/reset-relative-to-1-0">http://www.fpml.org/spec/2000/reset-relative-to-1-0</a>
♦ rollConventionSchemeDefault =	<a href="http://www.fpml.org/spec/2000/roll-convention-1-0">http://www.fpml.org/spec/2000/roll-convention-1-0</a>
[-] ♦ trade	(tradeHeader , product , party+ , otherPartyPayment*)
♦ type =	Trade
[-] ♦ tradeHeader	(partyTradeIdentifier+ , tradeDate , calculationAgentPartyR...

# FpML : Samples

<FpML>	<trade>	<tradeHeader>	<partyTradeIdentifier>	<tradeId> SW2000
[-] ♦	trade	(tradeHeader , product , party+ , otherPartyPayment*)		
	♦ type =	Trade		
[-] ♦	tradeHeader	(partyTradeIdentifier+ , tradeDate , calculationAgentPartyR...		
	♦ type =	TradeHeader		
[-] ♦	partyTradeIdentifier	(partyReference , tradeId+ , linkId*)		
	♦ type =	PartyTradeIdentifier		
[-] ♦	partyReference	empty		
	♦ href =	#CHASE		
[-] ♦	tradeId	TW9235		
	♦ tradeIdScheme =	http://www.chase.com/swaps/trade-id		
	♦ type =	string		
[-] ♦	partyTradeIdentifier	(partyReference , tradeId+ , linkId*)		
	♦ type =	PartyTradeIdentifier		
[-] ♦	partyReference	empty		
	♦ href =	#BARCLAYS		
[-] ♦	tradeId	SW2000		



# FpML : Samples

<FpML>	<trade>	<product>	<swap>	<swapStream>	<calculationPeriodDates>	<effectiveDate>
⊞	◆ product			(swap   fra)		
	◆ type =			<i>Product</i>		
⊞	◆ swap			(swapStream+ , additionalPayment*)		
	◆ type =			<i>Swap</i>		
	◆ --			Chase pays the floating rate every 6 months, based on 6M ...		
⊞	◆ swapStream			(payerPartyReference , receiverPartyReference , calculatio...		
	◆ type =			<i>InterestRateStream</i>		
⊞	◆ payerPartyReference			empty		
	◆ href =			#CHASE		
⊞	◆ receiverPartyReference			empty		
	◆ href =			#BARCLAYS		
⊞	◆ calculationPeriodDates			(effectiveDate , terminationDate , calculationPeriodDatesA...		
	◆ id =			floatingCalcPeriodDates		
	◆ type =			<i>CalculationPeriodDates</i>		
⊞	◆ effectiveDate			(unadjustedDate , dateAdjustments)		
	◆ type =			<i>AdjustableDate</i>		

# XBRL

- » XBRL is the **eXtensible Business Reporting Language**
- » Focusses on end-of-year company filings and reports
- » Major complexity is that each country has its own accounting standard; hard to compare across boundaries
- » Each will require a different **taxonomy** for XBRL; may change when **IAS** (**International Accounting Standards**) becomes widely used
- » However, conversion and comparision will be much easier; can be automated



# XBRL

- » What differs between taxonomies are (i) the list of defined accounting items, and (ii) the rules on how lower level items are added/subtracted/multiplied to give higher level items
- » XBRL allows companies to add their own items by extending their local XBRL **taxonomy**
- » XBRL has strong support from international accounting bodies and firms
- » Like FpML, XBRL separates architecture from product definition

# XBRL

- » XBRL 1.0 architecture is the antithesis of FpML
- » Designed to be **easily embedded** into general XML documents
- » Defines only 2 elements for general usage: **<item>** for accounting items, and **<group>** for grouping items with common attributes
- » The **type** attribute of an **<item>** identifies what kind of item:



# XBRL

```
<item type =  
    "ci:shortTermInvestments.marketableSecurities"  
>2</item>
```

- » Note the period "." in the **type** value
- » XBRL 1.0 uses namespaced hierarchical attribute values instead of hierarchical element structures
- » XBRL 1.0 **taxonomies** have a format very similar to that of XML Schemas

# XBRL

- » Important difference is that the `<element>` tag in an XBRL taxonomy defines a hierarchical `type` value, not an element name:

```
<schema xmlns=... targetNamespace=...>
  <import namespace=... schemaLocation=.../>
  <element name="intangibleAssetsGross.brandEquity"
    type="xbrl:monetary">
    <annotation>
      <appinfo> ... see next slide ... </appinfo>
    </annotation>
  </element>
</schema>
```



## XBRL : <appinfo> content

```
<xbrl:rollup  
  to="ci:intangibleAssetsNet.intangibleAssetsGross"  
  weight="1" order="4.5"/>  
<xbrl:label xml:lang="en">Brand Equity</xbrl:label>
```

# XBRL

- » Using attribute value hierarchies, and repurposing XML Schema constructs, makes it impossible to use standard XML tools with XBRL 1.0
- » For XBRL 2.0, there is pressure to move to a Schema-based syntax:



## XBRL : 2.0

» XBRL 1.0 —

```
<item type =  
  "ci:shortTermInvestments.marketableSecurities"  
>2</item>
```

» XBRL 2.0?? —

```
<ci:shortTermInvestments.marketableSecurities  
>2</ci:shortTermInvestments.marketableSecurities>
```

# XBRL

- » **US GAAP** (Commercial & Industrial) taxonomy completed first
- » 1000s of items; only one US corporation has used it to publish its company report
- » **UK** GAAP is taking a different approach; limited initially to 100s of items
- » It is hoped this will reduce the learning curve, and speed the uptake of XBRL in the UK



# XBRL

- » Reuters is planning to publish its 2001 company report in XBRL (UK GAAP)
- » Germany is also very advanced in its development of its XBRL taxonomy

# XBRL

- » A draft IAS GAAP taxonomy has been published
- » **EU** (European Union) corporations required to submit company reports in IAS form from 2005
- » IAS GAAP seems best placed to become the global standard taxonomy for company reports in XBRL (but will the US care?)



# MDDL

- » MDDL (**Market Data Definition Language**) is a financial information specification being produced by the **FISD** (**Financial Information Services Division**), part of the **SIIA** (**Software and Information Industry Association**)
- » To quote from the MDDL mission statement:

## MDDL

*The mission of the activity is to define a publicly available standard that provides a generic XML-based interchange format on the fields needed to describe financial instruments (including identifiers and current and historical values), corporate events (including specific corporate and instrument information affecting value and tradability), and market-related information (including economic and industrial indicators). The goal is to promote data interoperability.*



# MDDL

- » MDDL has only recently started its work
- » No firm details are available, but check out <http://www.fisd.net/mddl/default.html>
- » Initially focussing on end-of-day and snap information for financial instruments (share prices, etc.)
- » MDDL 1.0 will have both a DTD and an XML Schema
- » Valid instance documents will have to validate with both

## MDDL : Architecture

- » Child elements are properties which can be inherited/overridden

└ --	The currency of "b" is USD
└ ◆ a	
└ ◆ b	
◆ currency	USD
└ --	The currency of "b" is inherited from "a"
└ ◆ a	
◆ currency	USD
◆ b	
└ --	The currency of "b" is GBP, not USD
└ ◆ a	
◆ currency	USD
└ ◆ b	
◆ currency	GBP



## MDDL : Architecture

- » This interpretation makes it straightforward to layer extra information (metadata) onto an existing document
- » First open draft of MDDL 1.0 due end of June 2001; full 1.0 release due in November 2001 after implementation experience & feedback

# ISO 15022

- » A major non-XML specification which will influence MDDL and other financial XML specifications is ISO 15022
- » Provides a standard set of (>10k) data fields for financial information and (~100) messages for financial transactions
- » Data dictionary and catalogue of messages are maintained on ISO's behalf by **SWIFT** (**Society for Worldwide Interbank Financial Telecommunication**), a banking industry co-operative



# ISO 15022

- » An effort has been started to define a direct XML version of ISO 15022, one which supports not only ISO 15022 but also the existing (non-XML) SWIFT and **FIX** transaction protocols
- » However, this work has not yet been made public
- » Difficult to speculate whether ISO 15022 will influence financial XML usage more via its direct XML incarnation or via its integration into other XML specifications

# ISO 15022

- » MDDL uses 15022 as a basis for its data model, and the FISD is in discussions with ISO about making MDDL part of ISO 15022, possibly as **the** 15022 XML representation



## swiftML

- » SWIFT is an existing electronic messaging system used by major banks
- » Messages are being converted to XML under the name **swiftML**
- » SWIFT are closely involved with ISO 15022, on which the latest set of SWIFT messages is based
- » Architecturally, swiftML DTDs (XML Schemas eventually) are generated from UML models via a swiftML-specific set of mapping rules

## swiftML

- » Generated DTDs contain many fixed attributes with opaque ID codes of various kinds
- » Not clear whether the explicit inclusion of these IDs will be continued when swiftML eventually moves to XML Schemas



## swiftML : Sample

<Payment>	<CreditAcct>	<AcctID>
▣ ♦ Payment		
• elementID =		ABCD0003
• type =		ABCD0003
▣ ♦ CreditAcct		
• elementID =		ABCD0001
• roleID =		ABCD0005
• type =		ABCD0004
▣ ♦ Balance		
• elementID =		ABCD0002
• type =		float
▸ #text		1000
▣ ♦ AcctID		
• elementID =		ABCD0008
• type =		string
▸ #text		124-56789-1

# FIXML

- » FIX (**Financial Information Exchange**) is a non-XML financial transaction protocol which aims to be vendor-neutral
- » FIX consortium is composed of a group of banking and financial institutions who view themselves as clients rather than vendors
- » FIXML has been announced as the XML-isation of the existing FIX protocol (messages)
- » For an interim period, both traditional FIX messages and FIXML will be supported in parallel until FIX is eventually deprecated in favour of FIXML



# FIXML

- » Stéphane Bidoul from Software AG will be discussing XML for FIX in detail later in this session

# IRML

- » IRML is the **Investment Research Markup Language**
- » Aims to develop a specification for tabular investment research data, e.g. **morning notes** or front matter for full investment reports
- » Standardisation will make it possible to generate automated comparisons and summarisations of investment research from multiple firms
- » This will impact the way investment research is used in future



# IRML

- » Currently, individual users read only a small number of reports from selected analysts
- » IRML should make it worthwhile to take information from a wider range of analysts and combine them with a user's preferred weightings to get a broader and more balanced view
- » IRML is at an early stage in its development, and is currently being reorganised to better separate architectural issues from product issues
- » No samples are available at the time of writing

# RIXML

- » RIXML is the **Research Information eXchange Markup Language**
- » Investment research specification which focusses on metadata rather than reports structure or format
- » RIXML metadata is not just for XML documents, but any document
- » Allows better filtering of available information by clients
- » Some press reports have suggested that RIXML and IRML are direct competitors, one of which must wither, but this is not the case



# RIXML

- » RIXML 1.0 was released in March, 2001
- » Uses XML Schemas; constructs cannot be down-converted for DTDs
- » Defined in **UML**, then translated to XML Schema
- » A snippet of RIXML follows:

## RIXML : Sample

<SecurityFinancials>   <FinancialValue>	
▣ ♦ SecurityFinancials	
• SecurityFinancialQualifier =	Primary
• Currency =	USD
• PriorCurrent =	Current
▣ ♦ SecurityFinancialsType	
♦ value	EPS <span>• <i>scheme</i> =</span>
▣ ♦ FinancialValue	
• EstimateActual =	Estimate
• Period =	Q1
• PeriodEnd =	September
• PeriodYear =	2000
▣ #text	10 cents



# FinXML

- » FinXML is an XML specification for financial transactions from Integral
- » Not open, **patent pending**, but the licensing model has recently been loosened
- » Does appear to be gaining some interest from financial groups, but too early to judge likely success

# NewsML

- » NewsML is a multimedia news packaging and distribution format from the **IPTC** (**I**nternational **P**ress **T**elecommunications **C**ouncil)
- » Not specific to finance, but news is as important as statistics in shaping decisions of what to buy and sell
- » For financial information, NewsML is important as the XML way to provide the news side of the equation
- » NewsML provides rich facilities for packaging news and adding metadata, but does not define the format(s) of the actual content



# NewsML

- » Textual content in NewsML is most likely to be done using **XHTML** (eXtensible HyperText Markup Language) or **NITF** (News Industry Text Format)
- » Reuters will be using XHTML (automatically converted to NITF where required)
- » Some US-based news providers will be using NITF directly, as this is the preferred format of some US newspapers

# NewsML

- » When Reuters moves its full news production to NewsML (end of 2001), it will probably become the world's largest publisher of XHTML (we publish 3 bibles worth of textual news every day)



# MarketsML

- » Reuters has announced that it will be producing an XML specification for financial information and transactions, named **MarketsML**
- » Reuters is the largest financial information supplier in the world
- » Intention with MarketsML is to build a comprehensive set of XML Schemas which cover the full range of financial information and messages which Reuters deals with

# MarketsML

- » MarketsML will interoperate with NewsML to allow complex linking between news and financial statistics
- » Further details have not yet been released



## ebXML

- » While ebXML is a general e-business XML specification, and not specific to the financial industry, it would be wrong to leave it unmentioned in this context
- » The **do** half of financial XML is about financial transactions, while part of ebXML's scope is general business transactions
- » Due to the sums of money and the risks involved, financial transactions typically have more demanding requirements for speed, validation, authentication, and security than general business transactions

# ebXML

- » However, once the global ebXML infrastructure is in place, it would be surprising if that infrastructure were not suitable for at least some financial transactions
- » Migration could continue from there if the needs of the financial world drive the performance and functionality of ebXML implementations



# ebXML

- » Expect to see ebXML take a not insignificant role in financial transactions in the future
- » It is too early in ebXML's life to say where the first uses of ebXML for finance might occur

## Conclusion

- » The financial area is a large and complicated one, and XML is still only a recent technology
- » The people who understand financial information and transactions the best are not the ones who understand XML the best, so it is only to be expected that much of the XML work in finance is still at the level of bringing the right people together
- » FpML and XBRL particularly have made good progress in creating credible and open financial XML specifications



## Conclusion

- » There is not yet an XML specification that covers the bulk of financial information requirements, nor an XML specification which covers the bulk of financial transaction requirements
- » The financial community is clearly driving towards these, while at the same time trying not to over-divide the available development resources by pursuing simultaneously too many holy grails

## Conclusion

- » It is against this background that Reuters is developing its MarketsML family of XML Schemas, with the aim of uniting the representation of financial information via a consistent architectural approach
- » The latest version of this presentation will be available at <http://about.reuters.com/researchandstandards/events/2001/05/xml-europe/>
- » This URL is not yet in place, so in the meantime contact the author directly by e-mail as [tony.coates@reuters.com](mailto:tony.coates@reuters.com).



## Conclusion : About this talk

- » Slides written in XML (DocBook V4.1.2)
- » Converted to XSL-FO using XSL-T
- » Converted to PDF using XEP 2.01 (from RenderX)
- » Paper written using GCA's "gcapaper.dtd"
- » XMetaL customisations for "gcapaper.dtd" provided by SoftQuad

## References

- » ebXML — <http://www.ebxml.org/>
- » FpML — Financial Products Markup Language, <http://www.fpml.org/>
- » FinXML — <http://www.finxml.org/>
- » FIXML — <http://www.FIXprotocol.org/>
- » IRML — Investment Research Markup Language, <http://www.irml.org/>



## References

- » ISO15022 — <http://www.iso15022.org/>,  
[http://groups.yahoo.com/group/XML\\_Init\\_Main](http://groups.yahoo.com/group/XML_Init_Main)
- » MDDL — Market Data Definition Language,  
<http://www.fisd.net/mddl/default.html>
- » NewsML — <http://www.newsml.org/>,  
<http://newsshowcase.reuters.com/>
- » NITF — News Industry Text Format, <http://www.nitf.org/>

## References

- » OASIS — Organization for the Advancement of Structured Information Standards, <http://www.oasis-open.org/>
- » RELAX — REgular LAnguage description for XML, <http://www.xml.gr.jp/relax/>
- » RIXML — Research Information eXchange Markup Language, <http://www.rixml.org/>
- » SAF — Schema Adjunct Framework, <http://www.extensibility.com/resources/saf.htm>



## References

- » Schematron — <http://www.ascc.net/xml/resource/schematron/schematron.html>
- » swiftML — [http://www.swift.com/index.cfm?item\\_id=2642](http://www.swift.com/index.cfm?item_id=2642)
- » TREC — Tree Regular Expressions for XML,  
<http://www.thaiopensource.com/trex/>,  
<http://www.oasis-open.org/committees/trex/index.shtml>
- » XBRL — eXtensible Business Reporting Language,  
<http://www.xbrl.org/>

## References

- » XHTML — eXtensible HyperText Markup Language,  
<http://www.w3.org/MarkUp/>