



## Xbean Distributed Applications

Bruce Martin  
jGuru




## Distributed Applications

- XML data need to be *processed, communicated and shared.*
- An application that communicates and processes XML between computers is in fact, a *distributed application.*



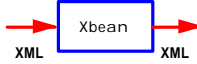
## Outline

- XML and distributed applications
- Xbeans defined
- Xbean channels
- Xbeans as Java Beans
- Example Xbeans
- XML over the wire
- Xbeans.org




## Xbean

- Java Bean that consumes XML, processes it and passes it on.




- Inspired by IBM's XML Productivity Kit for Java:
  - Distributed application focus
  - Open source project



## XML

- Portable, vendor neutral, readable data format.
- **Lingua franca for data exchange**
  - Standards groups representing almost every human endeavor are agreeing upon DTDs for exchanging data.



## Document Object Model

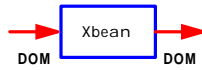
- Undesirable if every object processing XML had to parse it.
- W3C defined the Document Object Model (DOM).
- Standard application programmer's interface to XML data.
- Most XML parsers produce a DOM representation of the parsed XML.

# Xbean Distributed Applications

## More precisely ...



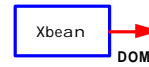
An Xbean is a Java Bean that consumes a DOM document, processes it and passes it on.



## Source Xbeans



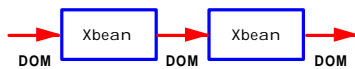
- An Xbean that produces a DOM document.



## Xbean Channels



- Xbeans are connected together to form applications.

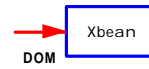


- Like a distributed UNIX pipe with tagged data.

## Sink Xbeans



- An Xbean that consumes a DOM document.

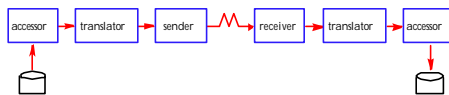


- Most Xbeans are both sources and sinks.

## Example Distributed Application



- Data Exchange



## Generic Xbeans

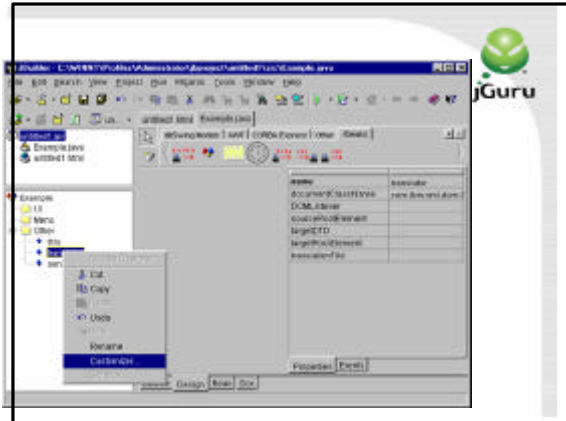


- A generic Xbean is an Xbean that will operate on any DOM document.
- The Java code does not statically depend on a particular DTD.

## DTD Specific Xbeans



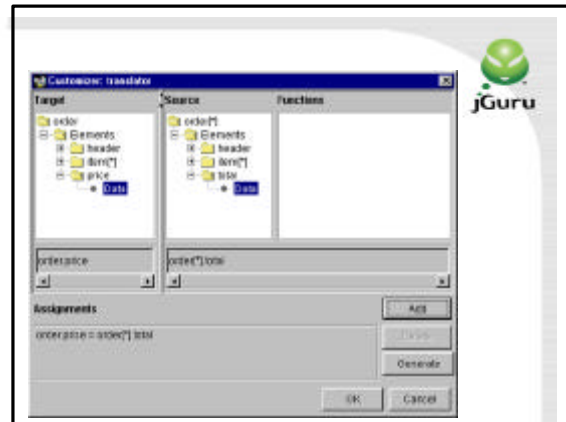
- An Xbean can be DTD Specific.
- The Xbean checks the document type.
- The Java code is written to operate on a document supporting a particular DTD.



## Customized Xbeans



- A customized Xbean is a generic Xbean that is customized at *design time* to be a DTD specific Xbean.
- The code is written generically but at runtime it operates on documents supporting particular DTDs.



## Xbeans are Java Beans



- **Configured using:**
  - Property editors
  - Customizers
- **Distributed Applications are created in a Java IDE**
  - Often without any additional programming

## Some Xbeans



- data access
- translator
- sender – receiver
- viewer
- parser
- writer

## Some Xbeans



- parallelizer
- synchronizer
- timer
- meter
- logger

Plus many more yet to be invented Xbeans!

## Two DOM Representations



- XML as text
- Serialized DOM implementation

## XML Over the Wire



Sender and receiver Xbeans *abstract the communication of XML "over the wire"*.



## Http, XML Text

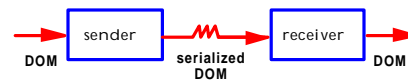


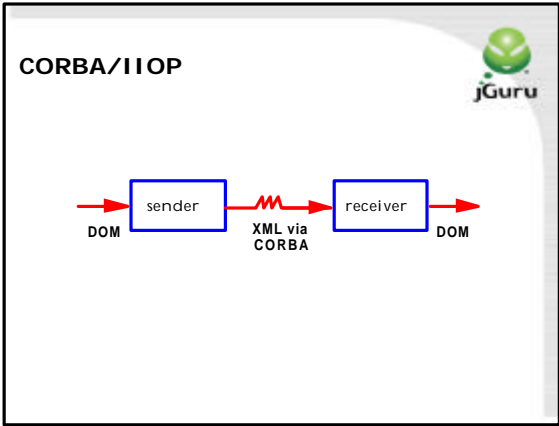
## Three Transports



- Http
- RMI
- CORBA

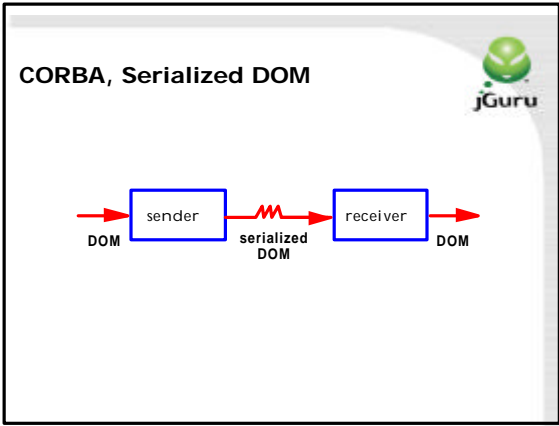
## RMI, Serialized DOM





### Performance Analysis

- Space XML text vs. serialized DOM
- Time to write DOM and reparse vs. Java serialization and deserialization of DOM
- Purchase order DTD
  - Typical ecommerce application
- Grew number of orders
- JavaWorld article presents results in detail.



### Space Results

Number of orders	Bytes to represent as XML text	Bytes to represent as serialized DOM	Ratio (serialized / text)
1	1,048	7,278	6.9
5	4,900	29,310	5.9
10	9,715	56,850	5.9
100	9,6385	552,570	5.7
500	481,585	2,755,770	5.7


### Analysis

	Http	RMI	CORBA
Space	+		
Time	+		
Ubiquity of Infrastructure	+		
Programming and execution model		+	+
Interoperability	+		+


### Timing Results

Number of orders	Milliseconds to write and reparse DOM	Milliseconds to serialize & deserialize DOM	Ratio (serialize / parse)
1	191	478	2.5
5	199	534	2.7
10	231	603	2.6
100	862	2228	2.6
500	4707	10107	2.1

## Xbean Distributed Applications

**Xbeans.org** 

- **Open source project**
- **First release available:**
  - sender/receiver for http, rmi, corba
  - timer
  - memory meter
- **Next release of Prof. Volker Turau's DB2xml will be an Xbean – data access**
- **Looking for contributors:**  
[www.xbeans.org](http://www.xbeans.org)



**Questions**