# CS155b: E-Commerce

Lecture 15: March 20, 2001

Introduction to XML

Acknowledgement: R. Glushko and A. Gregory

# Some Acronyms Used In This Lecture

HTML = Hyper Text Markup Language

XML = Extensible Markup Language

EDI = Electronic Data Interchange

ERP = Enterprise Resource Planning

MRP = Materials Requirement Planning

# The XML Revolution

- The Web was created to publish information for people
  - “eyes-only” was dominant design perspective
  - Hard to search
  - Hard to automate processing
- The Web is using XML to become a platform for information exchange between computers (and people)
  - Overcomes HTML’s inherent limitations
  - Enables the new business models of the network economy

# Extensible Markup Language

- Instead of a fixed set of format-oriented tags like HTML, XML allows you to create whatever set of tags are needed for your type of information.
- This makes any XML instance “self-describing” and easily understood by computers and people.
- XML-encoded information is smart enough to support new classes of Web and e-commerce applications.

# Why XML?

**Sample Catalog Entry in HTML**

<TITLE> Laptop Computer </TITLE>

<BODY>

<UL>

<LI> IBM Thinkpad 600E

<LI>400 MHz

<LI>

64 Mb

<LI>8 Gb

<LI> 4.1 pounds

<LI> $3200

</UL></BODY>

# XML's Big Idea: Document Types

- Customer Profiles
- Vendor Profiles
- Catalogs
- Datasheets
- Price Lists
- Purchase Orders
- Invoices
- Inventory Reports
- Bill of Materials
- Payments
- Deposits
- Credit Reports
- Schedules
- Directories
- …*whatever you need*

In XML the formal definition of permitted elements, attributes, and the rules by which they combine is called a Document Type Definition or DTD or schema

# Catalog Entry in XML

```
<COMPUTER TYPE=“Laptop”>
    <MANUFACTURER>IBM</MANUFACTURER>
    <LINE> ThinkPad</LINE>
    <MODEL>600E</MODEL>
    <SPECIFICAIONS>
       <SPEED UNIT = “MHz”>400</SPEED>
       <MEMORY UNIT=“MB”>64</MEMORY>
       <DISK UNIT=“GB”>8</DISK>
       <WEIGHT UNIT=“POUND”>4.1</WEIGHT>
       <PRICE CURRENCY=“USD”>3200</PRICE>
    </SPECIFICATIONS>
</COMPUTER>
```

# Smart Processing with XML

- <COMPUTER> and <SPECIFICATIONS> provide logical containers for extracting and manipulating product information as a unit
  - Sort by <MANUFACTURER>, <SPEED>, <WEIGHT>, <PRICE>, etc.
- Explicit identification of each part enables its automated processing
  - Convert <PRICE> from “USD” to Euro, Yen, etc.

# Traditional Business Models and Integration Requirements

Traditional models for electronic business are based on long-term, point-to-point, and tightly coupled relationships

- EDI is used here because high integration costs can be recovered over time
- Partners are more willing to invest in compatible IT infrastructure at each end or in middleware that creates a distributed application

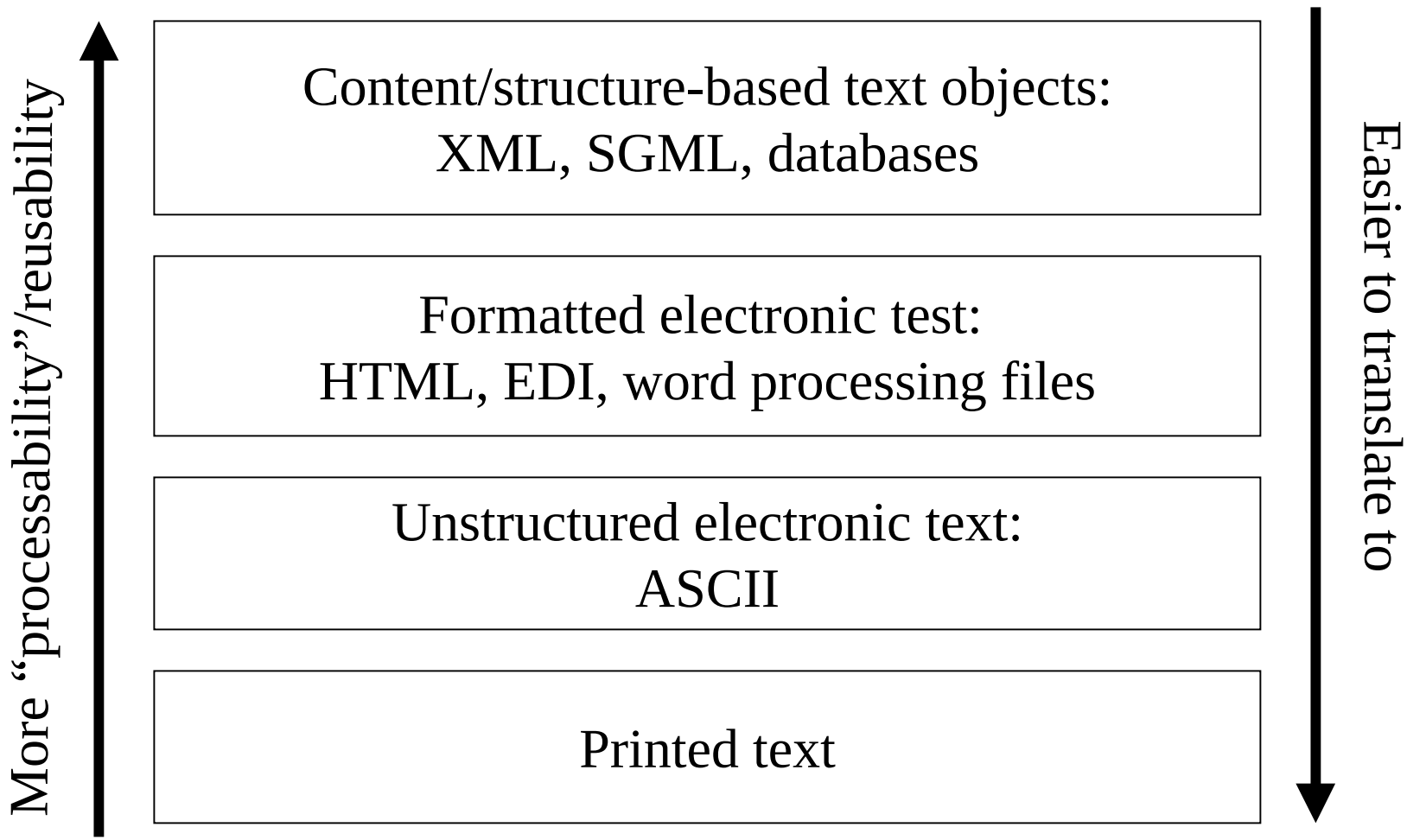
# Making Money in B2B

- Licenses and support
  - Traditional model, works for technology providers to B2B marketplaces
- Equity
  - But only if the B2B company can IPO
- XML has little to say about this

# Making Money in B2B

- Transaction fees
  - What counts as a transaction?
  - Who pays the fees – buyers or suppliers?
- Market efficiency
  - Driving costs out of supply chain for all participants
  - Exploit & refine existing business relationships & experience
- XML is crucial to these concerns

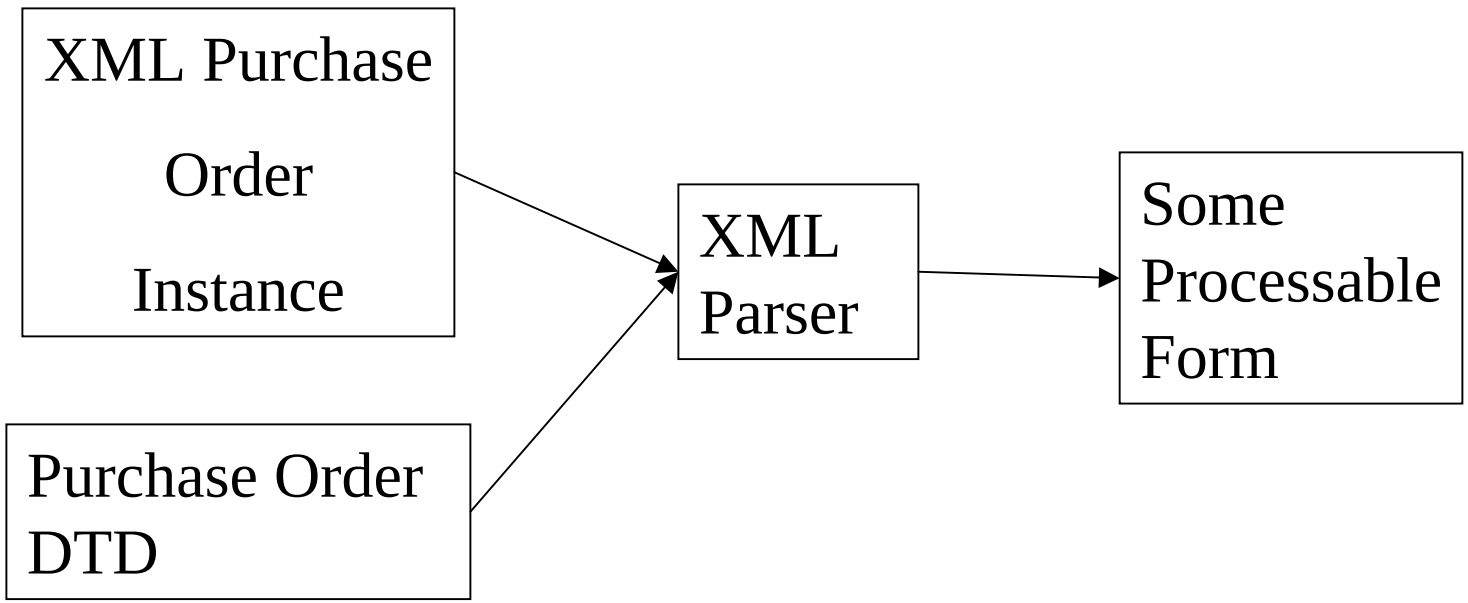
# XML and Information “IQ”



# DTDs, Parsers, and Validation

- From any DTD an XML parser can be generated that:
  - Reads a document instance (the XML data stream)
  - Identifies the markup in it
  - Create a processable form of some kind that is used by an application
- The parser can also test the XML document for conformance with the rules of the DTD
  - A document instance that follows the rules of the DTD is “valid”

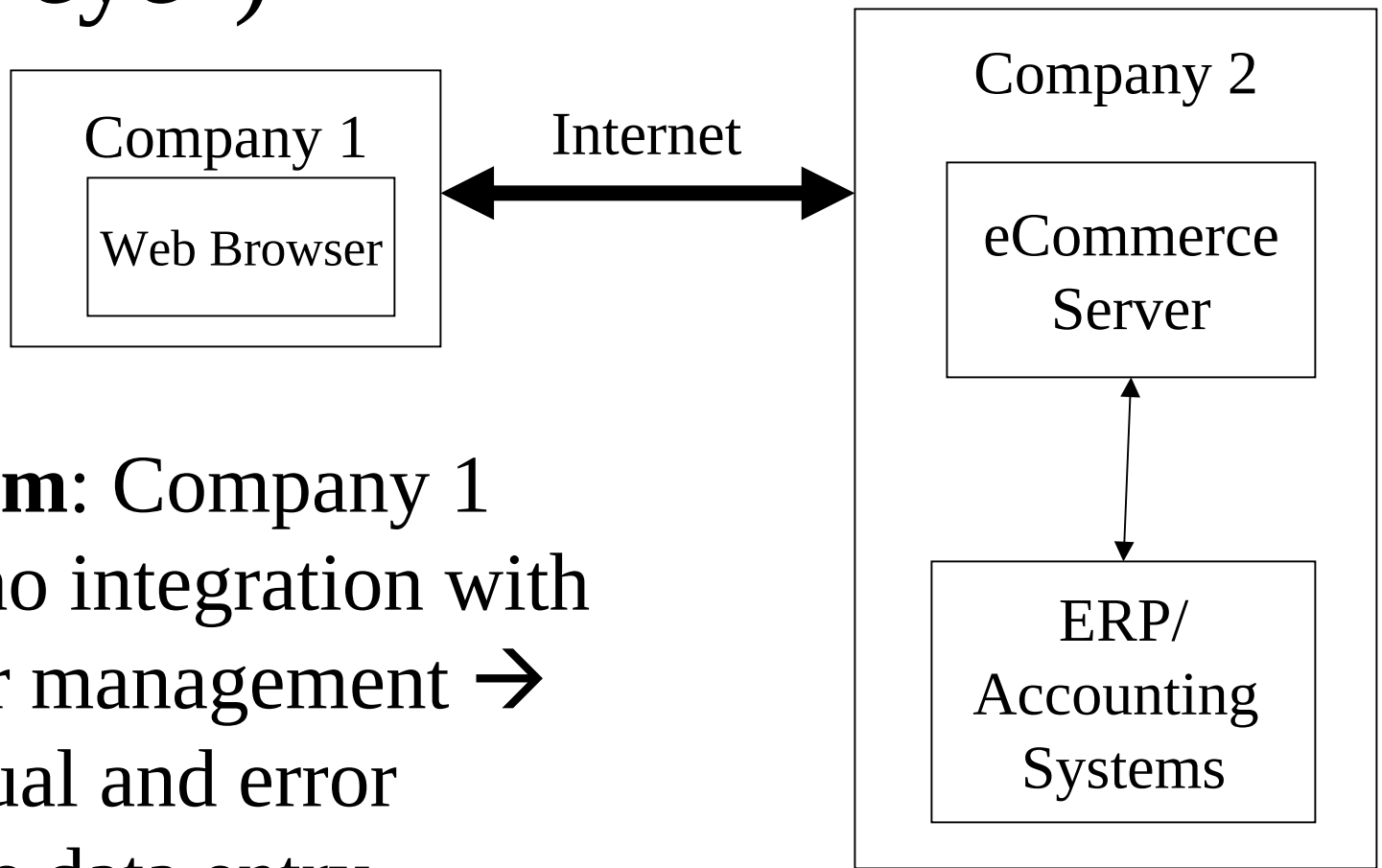
# DTDs And Validation



# XML Schemas in Electronic Commerce

- Essential to treat Dates, Monetary amounts, *etc*. as datatypes to enable validation
- Schema inheritance and extension mechanisms allow custom versions of same document to co –exist
  - Software can distinguish extensions from standard document and decide whether or not extensions can be safely ignored
  - Trading partners can customize messages for specialized needs while standard message maintains backward compatibility

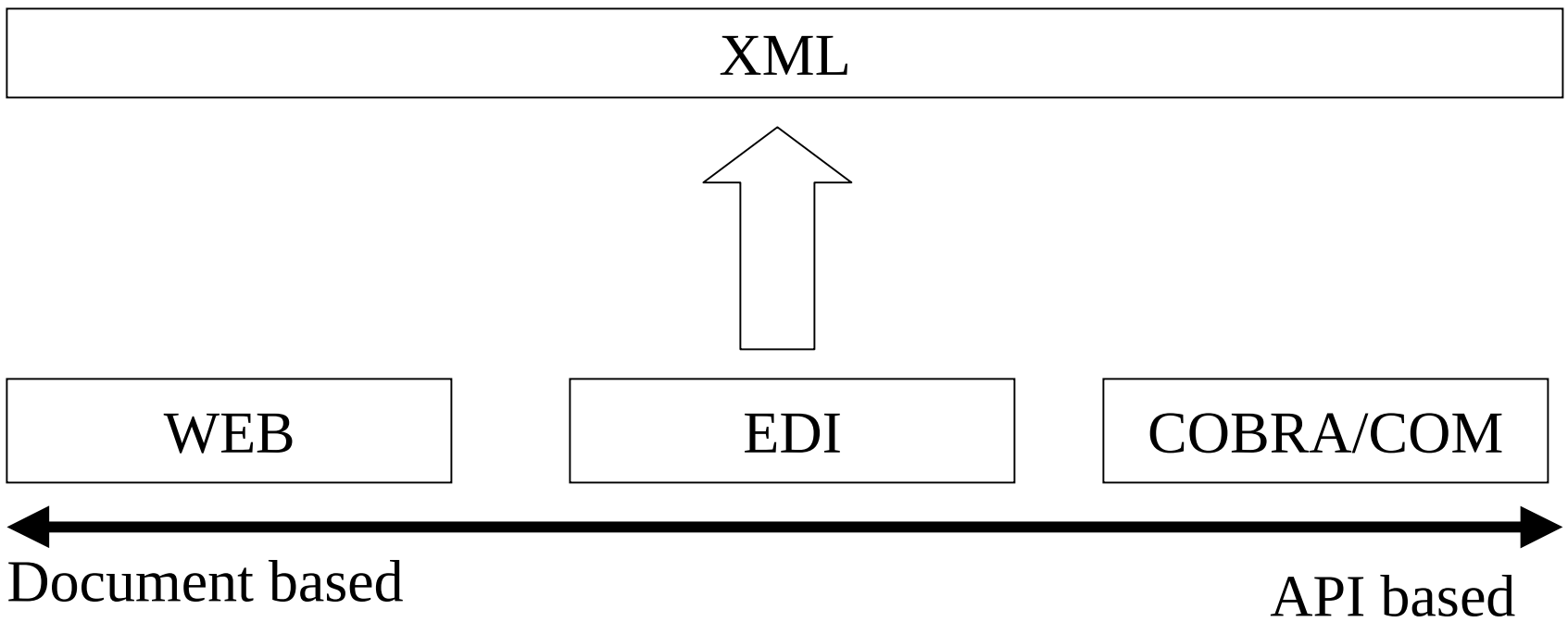
# Connecting with HTML ("by eye")



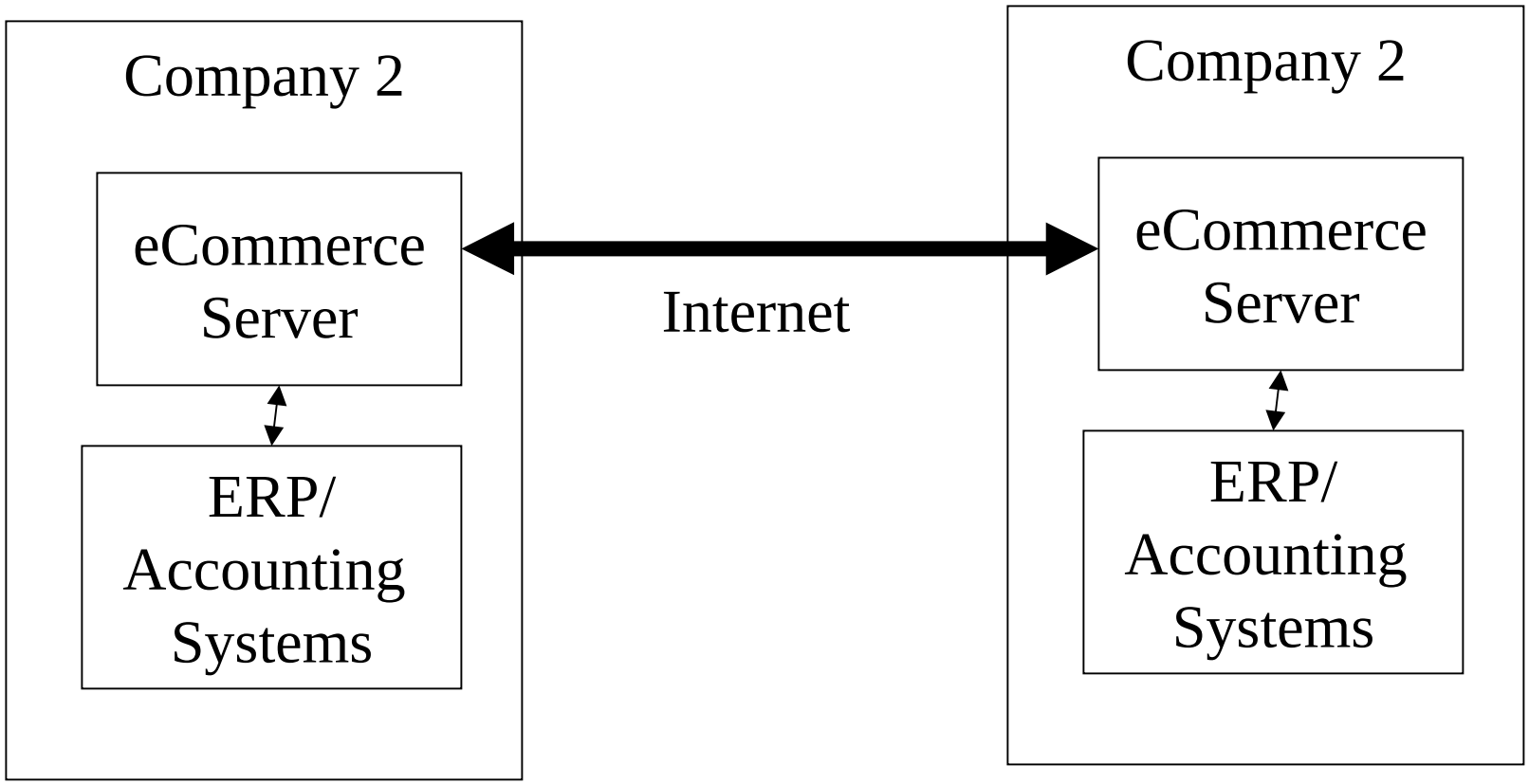

**Problem**: Company 1 has no integration with order management → manual and error prone data entry

# XML as Internet-Friendly Integration Technology

… exchange data in an application and vendor neutral format



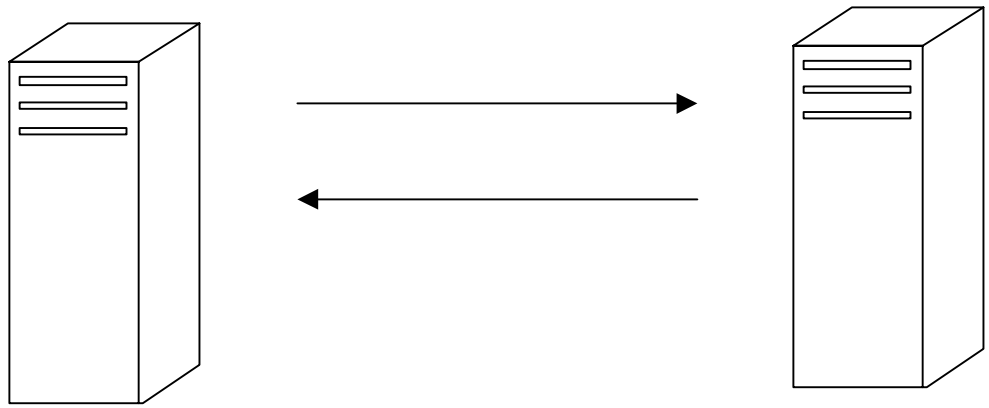
# Connecting using XML




Benefit: XML can be
Processed automatically
With huge cost savings

Problem: Company 1 and
Company 2 have to agree
On document format

# Business Processes are XML Document Exchanges



If you send me a **request** for a **catalog**, I will send you a catalog

If you send me a **purchase order** and I can fill it, I will send you a **purchase order response**

# Significance of XML Document Exchange Architecture

- Document exchange is a natural way to think about doing business.
- Easy to provide “open” marketplace with 3rd party buying and selling apps
- Easy to add and maintain services
- Document exchange between marketplaces is fundamentally the same as within a marketplace.
- Services can be reused across marketplaces.

# Functions of “Market Makers” in a Document Exchange Architecture

- Specifying document standards
- Routing documents between participants
- Providing standard interfaces for sharing services (registration, logistics, taxation, payment, etc.)

# XML is Part of the Solution

- XML has the potential to enable a standards-conforming, open and extensible architecture for electronic commerce.
- XML standards could enable ubiquitous connectivity and interoperability and create the network effects of “describe once, {sell, buy} anywhere” and reusable marketplace services.