22:010:622
Internet Technology and E-Business

Dr. Peter R. Gillett
Associate Professor
Department of Accounting & Information Systems
Rutgers Business School – Newark & New Brunswick

March 12, 2003
Additional Citation

Overview

- Electronic Commerce Software
- Digital Products!
- Digital Pricing continued from last week!
- XML: a little detail – (XML is used for E-Logistics)
- E-Commerce Tutorial
- Internet2: a first look
- “Dot-Com Business-Models from Mars”
- Data-Mining: the very basics
- Spring Break . . .
Electronic Commerce Software

Requirements:

- Catalog Display
- Shopping Cart
- Transaction Processing
  - Volume Discounts
  - Shipping Costs
  - Sales Tax
  - Middleware
- Tools to populate & maintain the catalog
- Tools to create & edit site content
Electronic Commerce Software

- Electronic Commerce Tools
- Application Servers
  - Page servers
  - Database managers
  - Content management
- Marketing
- Hosting (see also Chapter 8)
Electronic Commerce Software

- Basic Packages
  - Fundamental Host Services
  - Banner Advertising Exchange Sites
  - Full-Service Shared-Mall Hosting
    - Yahoo! Store, etc.
  - Estimated $2,670 total first year cost

- Mid-Range Packages
  - $2,000 - $10,000
    - Commerce Server 2000, etc.

- Enterprise Solutions
  - $200,000 - $10,000,000
    - IBM, Netscape, Oracle, Intel/SAP
Digital Products

- Some key legal issues
  - Copyright (50 after author’s death, 75 after publication for corporation or 100 after creation)
  - Service Marks (effectively forever)
  - Patents (20 years)
- Digital paradigm: lease software and don’t sell it!
- What about facts, lists, phone books, etc.?
- How about databases?
Digital Products

- High cost of copyright control and checking
- Always changing web pages and copyright: ASP, JSP, etc.
- Use of digital keys to help in copyright and Service Marks
  - How?
  - Public Key?
“Bicycle Exchange” Example

Alice wants to give her bike to Bob

- They never see each other
- Completely non-overlapping shifts
- Each has a bike lock

How can Alice get her bike to Bob?

What type of exchange is this?
Digital Products

- This is a Public-Key protocol for information exchange!
- How can Public-Key cryptography protocols help us with copyright?
- Digital Watermarks?
- Limiting use?
Digital Pricing

- Price Struggle: focus on the price attribute for gaining market share
- Choi et al.: “competition based only on price is often ineffective because profits for all competitors are sacrificed as prices are lowered in each round of struggle for market share.”
- Product differentiation moves away from the focus on price to other attributes.
Digital Pricing

Why is pricing a big issue in E-Marketing?

- Transparent pricing and specifications
- Auctions
- Online Customization (one-to-one marketing!)
- Lots of data on consumer preferences
XML in Detail

- Why was HTML a success?
  - Easy
  - Case insensitive
  - Forgiving
  - Tightly defined

- These reasons should boost XML
  - HTML has weaknesses that XML fills in
  - XML has other purposes in addition to presentation
XML in Detail

- In essence, XML is “a language for creating other languages”
- This is by defining your own Tags
- Each “new language” (set of user defined tags) is an XML Application
- XML’s parsers are much more picky than typical HTML parsers
XML in Detail

- All XML documents must be “well formed”
- All well formed XML documents are “guaranteed” to run
- Well formed
  - Required Root Element: wrapped around entire XML file
  - Required Closing Tags for each defined open tag, except for `<tag1 arg="foobar"/>` types
  - XML is case sensitive
XML in Detail

- Well formed
  - Proper Nesting:
    - `<animal> <name> foo</name> </animal>`
  - Attribute values must be in quotation marks
  - Entity references (new tags) must be declared (in a DTD or Schema) before they are used

- Optional XML declaration:
  - `<?xml version=“1.2”?>`
XML in Detail

- DTDs: Document Type Definition
  - Declare custom tags and rules
- XML Schema: which attributes or rules are required or allowed to compile a document
  - Not required
  - Used in validation of XML documents
- XML Schema replacing DTDs for XML
XML in Detail

Shortcomings of DTDs

* DTDs are not XML themselves!
* DTDs have global variables only
  - Can’t defined two tags with the same name even if these tags are in different contexts
* DTDs cannot specify the type of information in an element

W3C defined XML Schemas, which may replace XML DTDs
XML in Detail

- XML Schemas are written in XML
- XML Schema overcomes all shortcomings of DTDs just listed
- Each XML Schema has two sections
  - Simple types: elements of only text
  - Complex types: elements that contain attributes or other elements
- In-File Schema or Other-File Schema
Schema in other files

Declare the schema or schemas as the root element

- Example: `<xsd:schema xmlns::xsd = http://www.andromeda.rutgers.edu/~pgb/scm1>`
- `</xsd:schema>`

This web address is the “name space” and all variables with the prefix “xsd” are declared here
Between the `<xsd:schema>` and `</xsd:schema>` tags we have the Schema Rules

`xmlns:xsi=http://foo.bar/file_here`

* Indicates Simple Schema’s Location
Simple types in Schema

Examples:

- `<xsd:element name="weight" type="xsd:string"/>
- `<xsd:element name="population" type="xsd:integer">

See http://www.w3.org/TR/xmlschema-2/

Many complex types: date, time, custom
XML in Detail

- XML validation
- Must have all name spaces and declarations
- Test with a Validator
  - www.w3.org/2000/06/webdata/xsv
  - www.stg.brown.edu/service/xmlvalid
- XHTML, etc.
XML in Detail

- We can use Cascading Style Sheets (CSS) to display XML.
- Data binding allows us to display XML from within HTML pages to give us the best of both worlds.
- XSLT transforms XML into other XML, HTML, spreadsheet, etc. (server or client side).
XML in Detail – a DTD

<!DOCTYPE officeBookInventory [
<!ELEMENT officeBookInventory (book)>
<!ELEMENT book (title, author, publisher, howUsed, notes)>
<!ATTLIST book type CDATA #REQUIRED>
<!ELEMENT title (#PCDATA)>
<!ELEMENT author (#PCDATA)>
<!ELEMENT publisher (#PCDATA)>
<!ATTLIST publisher date CDATA #IMPLIED>
<!ELEMENT howUsed (#PCDATA)>
<!ATTLIST howUsed class (yes|no) #REQUIRED research (yes|no) #REQUIRED cd (yes|no) #REQUIRED>
<!ELEMENT notes (#PCDATA)>
]>

XML in Detail – an Order

<salesOrder>
  <dateSoldOn>04/01/2001</dateSoldOn>
  <item>
    <itemDescription>Speedo swimsuit</itemDescription>
    <itemRetailPrice>29.95</itemRetailPrice>
    <itemSalePrice>24.95</itemSalePrice>
  </item>
  <shipping>
    <shippingMethod>UPS ground</shippingMethod>
    <shippingCost>4.00</shippingCost>
  </shipping>
</salesOrder>
Plan out your Web Site

* What are you trying to do?
  - Probably multifaceted
  - Isolate each target

* How do you measure your success?
  - Try to measure success fast
  - Dynamically update details

* Testing, building, iterate again!
E-Commerce Tutorial

- Start small, measure, polish, iterate
- A web site is not a one-off project!
  - This is one of the biggest problems!
- Examine each step of the purchase model!
- Sales and Marketing Cycle:
  - Advertise and awareness
  - Sales and Service
  - The Sale!
  - Post Sales Service!
E-Commerce Tutorial

- Examine the Information Structure of your Web Site
  - Is it a shallow tree or a deep tree?
  - One of your purposes is to provide consumers with information
  - Beware of Cycles!
- Compare the costs with their Brick-and-Mortar Equivalents (don’t be too cheap!)
- Build Requirements Documents
E-Commerce Tutorial

Details to recall:

- Promotions (traditional and web)
- Transaction Processing (amazon.com One-Click)
- Fulfillment (shipping and tracking)
- Post-sales service (web portal)
- Marketing and Data Analysis (data mining)
- Company/Product Branding (e-products)
E-Commerce Tutorial

E-Store Front Design

* Don’t count out the Internet Shopping Experience
  - Make it easy for consumers to become customers!
  - How can you measure consumers becoming customers?
  - Build loyalty! How can you measure loyalty on the Internet?
* Cross-selling is enhanced by the Internet
* Life event selling is enhanced by the Internet
* Sweet Spots and the Internet!
* Familiarity breeds sales . . .
E-Commerce Tutorial

Develop E-Marketing and E-Logistic Strategies

Some strategies:

- Free Shipping on large orders
- Make it simple: one fee for shipping
- Get some more information for your database on each transaction
- Be very careful in limiting surprises
E-Commerce Tutorial

- Credit Card/Debit Card Transactions
- Can’t charge customer until they receive the product
  - Authentication
  - Authorization
  - Settlement
- Link Web-Log data with transactions
E-Commerce Tutorial

- Measure and consider cost-of-sales for both brick-and-mortar and Internet
10 Golden Rules: Argenti & Boritz

- Keep it simple
- Make it fast
- Build trust
- Give Directions
- Welcome the shopper
- Create communities
- Service the customer
- Think globally
- Shipping must be easy
- Let the world know
Internet2: a first look

- Partnership of
  - 190 Universities
  - Industry
  - Government

- Goals from www.internet2.edu:
  - Leading edge network for national research community
  - Enable revolutionary applications
  - Ensure rapid transfer to industry

- Convergence?
Internet2: a first look

- Fat pipes initiative
- High bandwidth for convergence
- Very preliminary stages
  - Some of the present experiments
  - End-to-end performance initiative
  - Need good performance measures
- What types of performance measures?
- Business applications?
See Russ Hubby’s Document “End-to-End Performance”

Overall end-to-end performance depends on at least:

- Implementation
- Operation
- Applications design

Discussed as research - how about business?
Internet2: a first look

- Key Issues:
  - Multicast
  - QoS
  - RTP (media streaming protocol)
  - TCP
  - Gigabit flows > 200 Mbps (ATM, etc.)
  - Low Latency (< 60ms)
- Room for specialized applications
Internet2: a first look

- Host Computer and Host Operating System can effect network performance of Host and other computers
- Example: make the memory used by TCP very large
  - Can cause “disk swapping”
  - This will slow the computer and its network functions!
- New proposals for Host/Operating System
- How to optimize past this?
“Dot-Com B-Models from Mars”

From Business Week:

- Amazon.com lost a total of about $1.5 Billion from its start in 1994 to Sept. 2000
- Amazon is still going strong
- Many other sinking dot-coms
- Market has shifted from B2C to B2B
“Dot-Com B-Models from Mars”

- Toilet Paper Model: selling consumer commodities
  - Webvan and Peapod
  - What went wrong?
- The "Whatever" model: Keep trying ‘till someone gets it right’
  - mortgage.com, which, after losing $11 million on revenue of $11 million started in another market
  - AskJeeves started selling directly to firms
“Dot-Com B-Models from Mars”

- Mal-Content Model: make money on angry people
  * Salon lost $18.3 million on sales of $8 million
  * Who pays?

- Just Plain Crazy Models
  * Buy.com sell goods at wholesale prices
Data Mining for the Internet

- What is Data Mining?
  - CRM and Data Mining
  - Security and Data Mining

- Why is it particularly applicable on the Internet?

- Automated Sales Analysis vs. Data Mining
Data Mining: the very basics

- Relational Databases: Codd @ IBM
  - Related data in tables
  - Rows and Columns for specific attributes

- Why Databases on the Web?
  - Necessary
  - Easy to interface due to the connectivity of the Web

- SQL: Structured Query Language

- Generally training and testing sets
**Data Mining: the very basics**

- **SQL example:**
  - `select customers with annual_income >= 100,000`
  - The rows are customers
  - The columns include “annual_income” as a field
  - The columns have other information, such as address, people in household, email address, etc.
Data Mining: the very basics

- Trying different features
- Many algorithmic approaches
- Artificial Neural Networks
  - McCulloch and Pitts
  - Simulate the real thing
  - Trigger-based
- Basic parts:
  - Input
  - Hidden layers
  - Output layers
Data Mining: the very basics

- Uses Supervised Learning
  - Training and testing sets
- Forward Propagation
- Back Propagation - feed forward
Data Mining: the very basics

Pros:
- Quick
- Efficient
- Good pattern matchers

Cons:
- Hard to reverse-engineer
- Usual problems with data mining: you must be careful with training and testing sets
Electronic Payment

- Electronic Cash
  - PayPal, etc.
- Electronic Wallets
  - W3C Proposed Standard
  - ECML Standard
- Stored-Value Cards
- Credit and Charge Cards
- SET
Spring Break

- Weee!!!
- There is LOTS of reading assigned for the following week – it would be a good plan to get a head start . . .
- Don’t forget that Group Project Proposals are due on March 26
- With the aid of readings, and a good search engine or two, can you define and explain briefly the following:
Internet Technologies

- URL
- TCP
- IP
- TTL
- ICMP
- UDP
- HTTP
- FTP
- SGML
- HTML
- XHTML
- DHTML
- XML
- RFC
Internet Technologies

- IAB
- IETF
- ISP
- DNS
- POP3
- SMTP
- IMAP
- MIME
- OLAP
- CRM
- OSI
- EDI
- CGI
- PERL
Internet Technologies

- VBScript
- ActiveX
- JVM
- Java
- JavaScript
- Jscript
- J++
- J#
- J Builder
- Java Beans
- JDBC
- JMS
- JSP
- J2EE
Internet Technologies

- JPEG
- GIF
- RGB
- CMYK
- CSS
- RSA
- DES
- MD5
- AES
- SSL
- S-HTTP
- PPP
- PAP
- CHAP
Internet Technologies

- PGP
- SET
- ORB
- PHP
- VPN
- URI
- DTD
- XML Schema
- XPath
- XLink
- XPointer
- XSLT
- XBRL
Internet Technologies

- ASP
- ADO
- MOM
- WSDL
- UDDI
- COM
- DCOM
- DOM
- IIOP
- IDL
- RPC
- RMI
- CORBA
- SOAP