# Building E-Commerce and

# E-Learning Models

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# Electronic Commerce (E-Commerce)

❖Commerce refers to all the activities the purchase and sales of goods or services.

❖Marketing, sales, payment, fulfillment, customer service

❖Electronic commerce is doing commerce with the use of computers, networks and commerce-enabled software (more than just online shopping)

# Brief History

❖ 1970s: Electronic Funds Transfer (EFT)
  ❖ Used by the banking industry to exchange account information over secured networks
❖ Late 1970s and early 1980s: Electronic Data Interchange (EDI) for e-commerce within companies
  ❖ Used by businesses to transmit data from one business to another
❖ 1990s: the World Wide Web on the Internet provides easy-to-use technology for information publishing and dissemination
  ❖ Cheaper to do business (economies of scale)
  ❖ Enable diverse business activities (economies of scope)

# E-commerce applications

- ❖ Supply chain management
- ❖ Video on demand
- ❖ Remote banking
- ❖ Procurement and purchasing
- ❖ Online marketing and advertisement
- ❖ Home shopping
- ❖ Auctions

eCommerce Growth For Western Europe
(Source: Forrester Research)
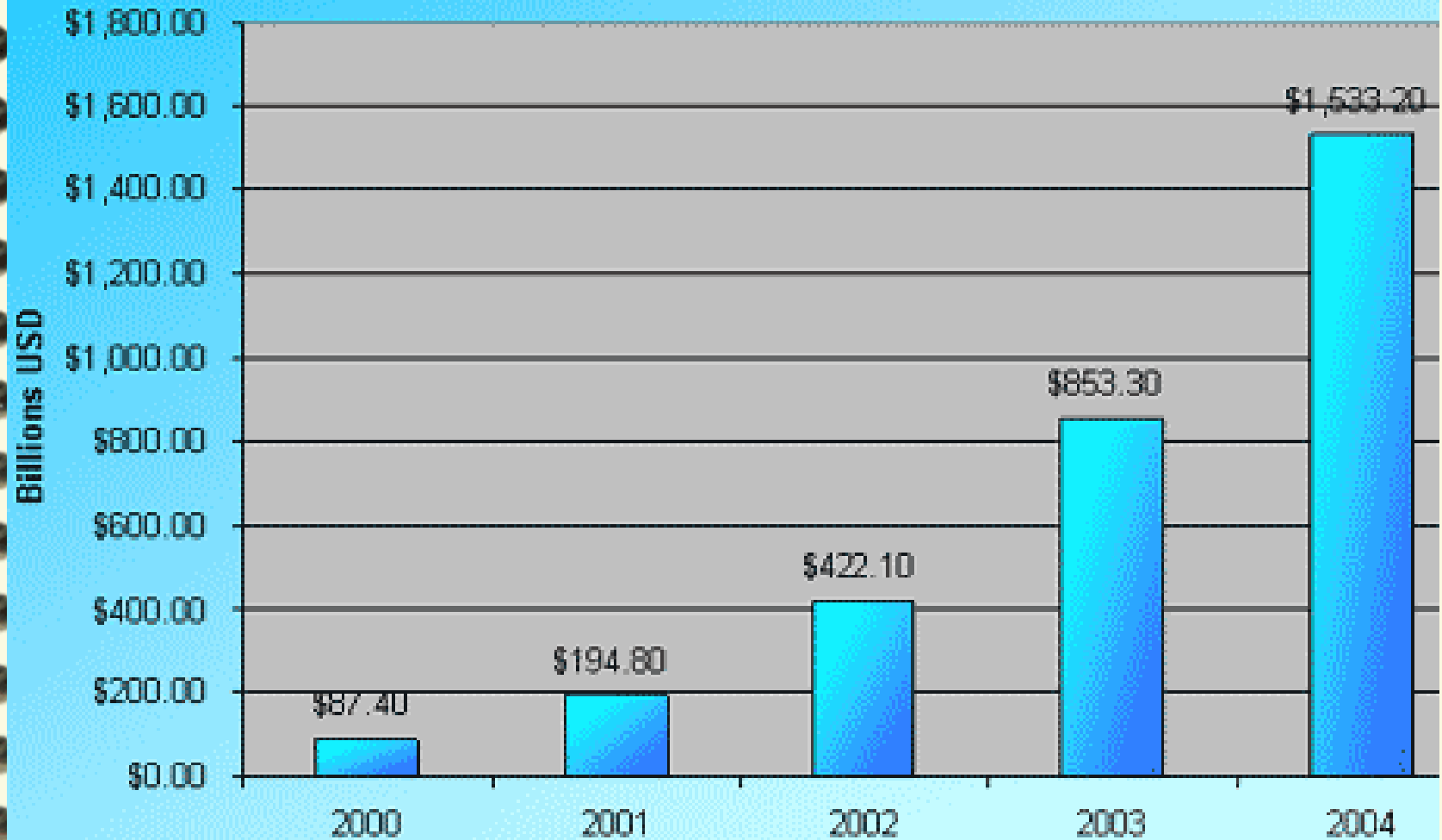
# Ecommerce infrastructure

❖ Information superhighway infrastructure
  ❖ Internet, LAN, WAN, routers, etc.
  ❖ telecom, cable TV, wireless, etc.
❖ Messaging and information distribution infrastructure
  ❖ HTML, XML, e-mail, HTTP, etc.
❖ Common business infrastructure
  ❖ Security, authentication, electronic payment, directories, catalogs, etc.

# The Main Elements of E-commerce

❖ Consumer shopping on the Web, called B2C (business to consumer)

❖ Transactions conducted between businesses on the Web, call B2B (business to business)

❖ Transactions and business processes that support selling and purchasing activities on the Web

　❖ Supplier, inventory, distribution, payment management

　❖ Financial management, purchasing products and information

# Advantages of Electronic Commerce

❖ Increased sales
  - ❖ Reach narrow market segments in geographically dispersed locations
  - ❖ Create virtual communities

❖ Decreased costs
  - ❖ Handling of sales inquiries
  - ❖ Providing price quotes
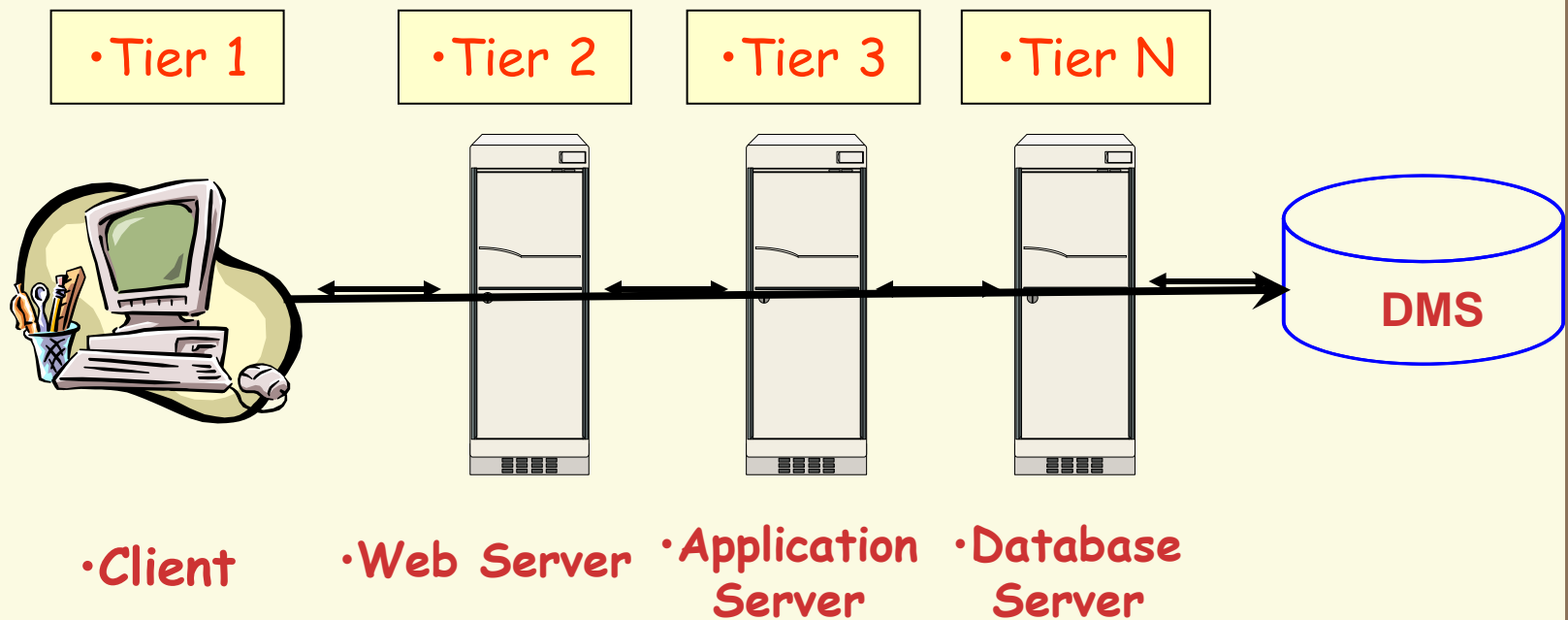  - ❖ Determining product availability

❖ Being in the space

# Disadvantages of Electronic Commerce

- ❖ Loss of ability to inspect products from remote locations

- ❖ Rapid developing pace of underlying technologies

- ❖ Difficult to calculate return on investment

- ❖ Cultural and legal impediments

# The process of e-commerce

1. Attract customers
   - ❖ Advertising, marketing
2. Interact with customers
   - ❖ Catalog, negotiation
3. Handle and manage orders
   - ❖ Order capture
   - ❖ Payment
   - ❖ Transaction
   - ❖ Fulfillment (physical good, service good, digital good)
4. React to customer inquiries
   - ❖ Customer service
   - ❖ Order tracking

# Web-based E-commerce Architecture

•Tier 1

•Tier 2

•Tier 3

•Tier N

**DMS**

•**Client**

•**Web Server**

•**Application Server**

•**Database Server**

# E-commerce Technologies

- Internet
- Mobile technologies
- Web architecture
- Component programming
- Data exchange
- Multimedia
- Search engines
- Data mining
- Intelligent agents

- Access security
- Cryptographic security
- Watermarking
- Payment systems

# Infrastructure for E-commerce

- ❖ The Internet
  - ❖ system of interconnected networks that spans the globe
  - ❖ routers, TCP/IP, firewalls, network infrastructure, network protocols
- ❖ The World Wide Web (WWW)
  - ❖ part of the Internet and allows users to share information with an easy-to-use interface
  - ❖ Web browsers, web servers, HTTP, HTML, XML
- ❖ Web architecture
  - ❖ Client/server model
  - ❖ N-tier architecture; e.g., web servers, application servers, database servers, scalability

# E-Commerce Software

❖ Content Transport

  ❖ pull, push, web-caching, MIME

❖ Server Components

  ❖ CGI, server-side scripting

❖ Programming Clients

❖ Sessions and Cookies

❖ Object Technology

  ❖ CORBA, COM, Java Beans/RMI

❖ Visual Studio .NET 2005 (ORCAS, ASP.NET, … etc)

❖ Technology of Fulfillment of Digital Goods

  ❖ Secure and fail-safe delivery, rights management

# System Design Issues

❖Good architectural properties
  ❖Functional separation
  ❖Performance (load balancing, web caching)
  ❖Secure
  ❖Reliable
  ❖Available
  ❖Scalable

# Creating and Managing Content

- ❖ What the customer see
- ❖ Static vs. dynamic content
- ❖ Different faces for different users
- ❖ Tools for creating content
- ❖ Multimedia presentation
- ❖ Integration with other media
- ❖ Data interchange
- ❖ HTML, XML (Extensible Markup Language)

# Cryptography

❖ Keeping secrets
  - ❖ Privacy:  interceptor cannot use information
  - ❖ Authentication:  sender's identity cannot be forged
  - ❖ Integrity:  data cannot be altered
  - ❖ Non-repudiation:  sender cannot deny sending
❖ How to evaluate cryptography
❖ Secret key (symmetric) cryptography; e.g., DES
❖ Public key (asymmetric) cryptosystems; e.g, RSA
❖ Digital signatures, digital certificates
❖ Key management; e.g., PKI

# Public-Key Cryptography
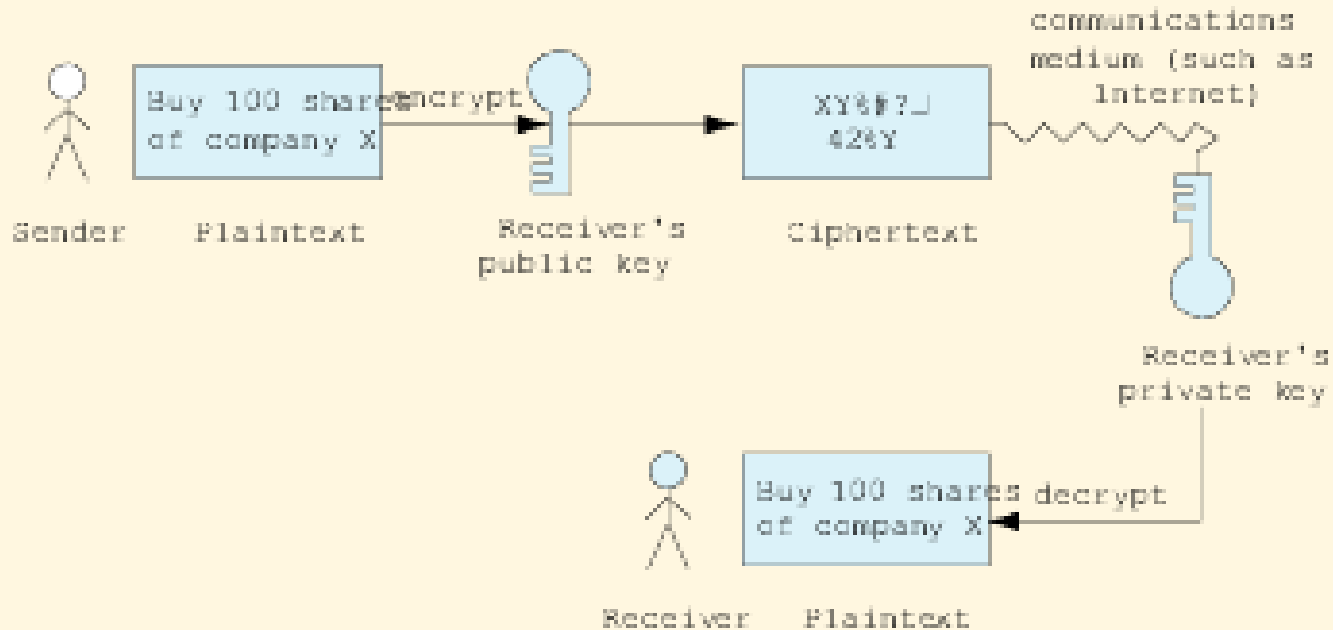


Encrypting and decrypting a message using public-key cryptography.

# Security

- ❖ Concerns about security
- ❖ Client security issues
- ❖ Server security issues
- ❖ Security policy, risk assessment
- ❖ Authentication methods
  - ❖ Something you know:  passwords
  - ❖ Something you have:  smart card
  - ❖ Something you are:  biometrics
- ❖ Firewalls, proxy servers, intrusion detection
- ❖ Denial of service (DOS) attacks, viruses, worms

# Payment Systems

❖ Role of payment

❖ Cash

  ❖ properties: wide accept, convenient, anonymity, un-traceability, no buyer transaction cost

❖ Online credit card payment, Smart Cards

  ❖ Secure protocols: SSL, SET

❖ Internet payment systems

  ❖ Electronic cash, digital wallets

❖ Micro-payments

❖ Wireless devices

# Transactions Processing

❖ Transactions and e-commerce

❖ Overview of transaction processing

❖ Transaction processing in e-commerce

❖ Keeping business records, audit, backup

❖ High-availability systems

❖ Replication and scaling

❖ Implementation

# Other System Components

- ❖ Taxes

- ❖ Shipping and handling

- ❖ Search engines

- ❖ Data mining

- ❖ Intelligent agents

- ❖ Inventory management, enterprise resource planning (ERP)

- ❖ Customer relation management (CRM)

# Auction (public sale) Model
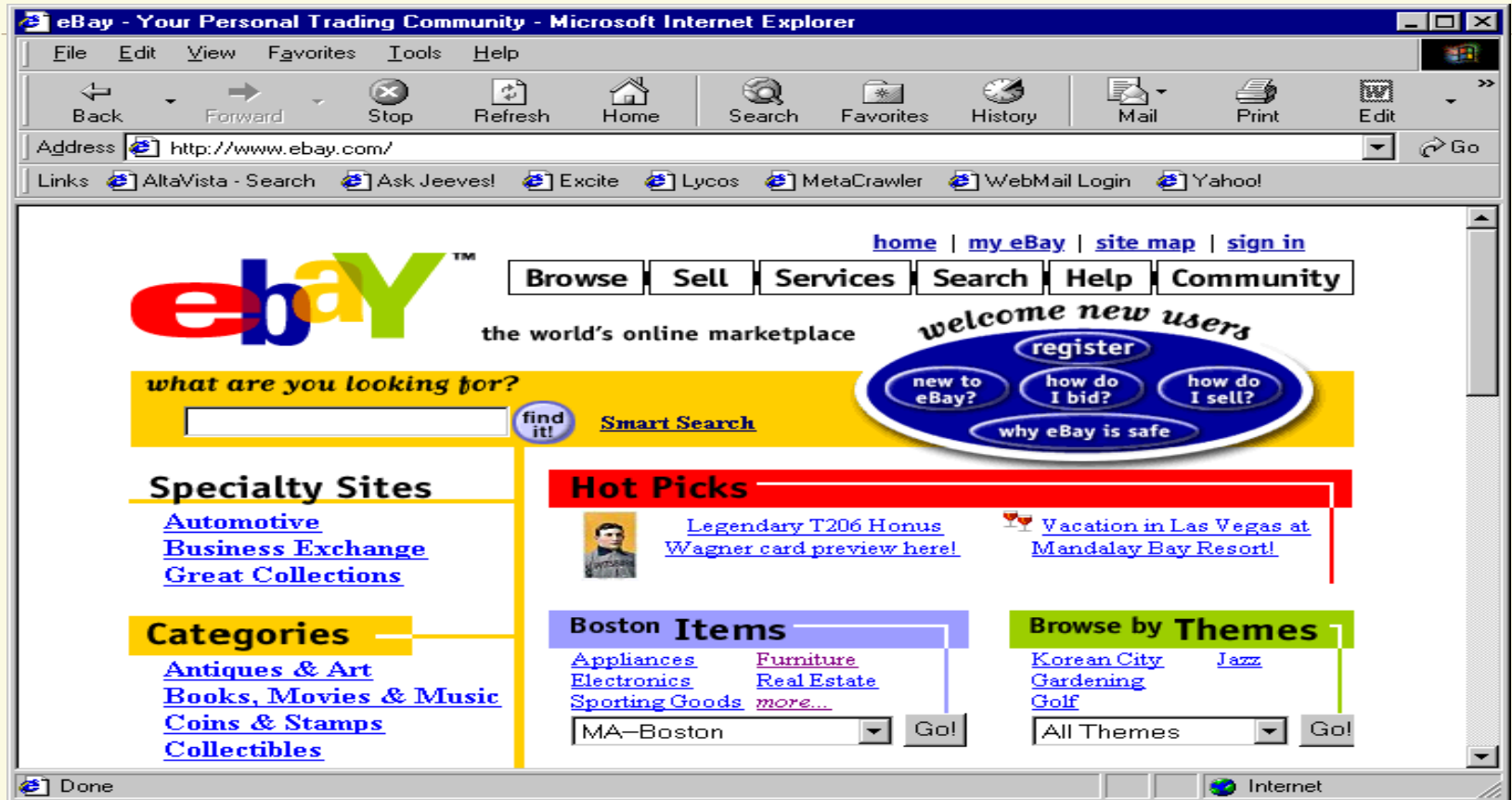


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# Public Sale (Auction) Model



Placing a bid on eBay. (These materials have been reproduced by Prentice Hall with the permission of eBay, Inc. COPYRIGHT  EBAY, INC. ALL RIGHTS RESERVED.)

# Course Outline

❖ Overview of e-commerce

❖ The Internet and the WWW

❖ E-commerce software building blocks and tools

❖ Scalability, high-performance servers, web caching

❖ Basic cryptography

❖ Security, watermarking, firewalls

❖ Payment systems

❖ Current and future directions