E-Commerce
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Paper –SEC1

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What is Ecommerce?

- Ecommerce, also known as electronic commerce or internet commerce, refers to the buying and selling of goods or services using the internet, and the transfer of money and data to execute these transactions. Ecommerce is often used to refer to the sale of physical products online, but it can also describe any kind of commercial transaction that is facilitated through the internet.

What is Ecommerce? Contd .

- Whereas e-business refers to all aspects of operating an online business, ecommerce refers specifically to the transaction of goods and services.
- The history of ecommerce begins with the first ever online sale: on the August 11, 1994 a man sold a CD by the band Sting to his friend through his website NetMarket, an American retail platform. This is the first example of a consumer purchasing a product from a business through the World Wide Web—or “ecommerce” as we commonly know it today.

Types of Ecommerce Models

There are four main types of ecommerce models that can describe almost every transaction that takes place between consumers and businesses.

- **1. Business to Consumer (B2C):**
  When a business sells a good or service to an individual consumer (e.g. You buy a pair of shoes from an online retailer).
- **2. Business to Business (B2B):**
  When a business sells a good or service to another business (e.g. A business sells software-as-a-service for other businesses to use)

Types of Ecommerce Models – Contd.

- **3. Consumer to Consumer (C2C):**
  When a consumer sells a good or service to another consumer (e.g. You sell your old furniture on eBay to another consumer).

  4. Consumer to Business (C2B):
  When a consumer sells their own products or services to a business or organization (e.g. An influencer offers exposure to their online audience in exchange for a fee, or a photographer licenses their photo for a business to use).

Objectives of E -Commerce

- Define e-commerce and understand its role as a transaction processing system

- List the three types of e-commerce, and explain how e-commerce supports the stages of the buying process and methods of marketing and selling

- Discuss several examples of e-commerce applications and services

Objectives (continued)

- Define m-commerce, and describe several m-commerce services

- List the components of an e-commerce system, and explain how they function together to provide e-commerce services

Examples of Ecommerce

- Ecommerce can take on a variety of forms involving different transactional relationships between businesses and consumers, as well as different objects being exchanged as part of these transactions.
- **1. Retail:**
  The sale of a product by a business directly to a customer without any intermediary.

  2. Wholesale:
  The sale of products in bulk, often to a retailer that then sells them directly to consumers.

  3. Dropshipping:
  The sale of a product, which is manufactured and shipped to the consumer by a third party.

Examples of Ecommerce

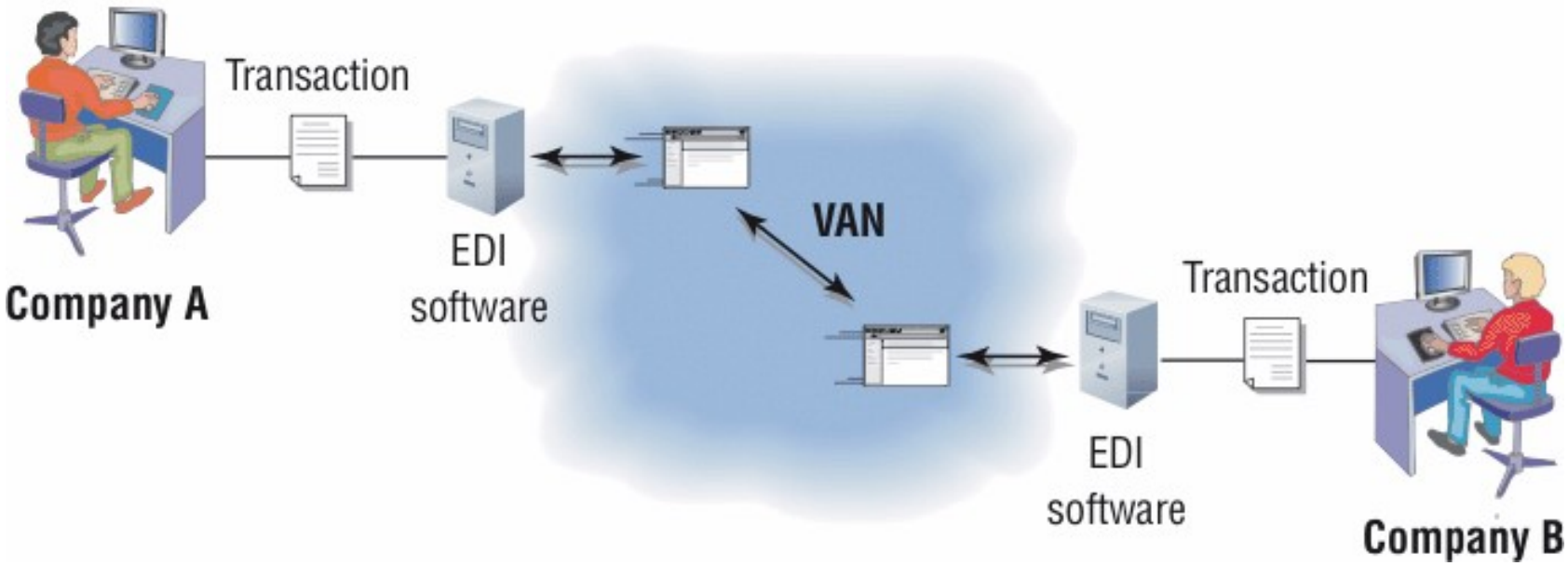
- **4. Crowdfunding:**
  The collection of money from consumers in advance of a product being available in order to raise the startup capital necessary to bring it to market.
  5. Subscription:
  The automatic recurring purchase of a product or service on a regular basis until the subscriber chooses to cancel.
  6. Physical products:
  Any tangible good that requires inventory to be replenished and orders to be physically shipped to customers as sales are made.
  7. Digital products:
  Downloadable digital goods, templates, and courses, or media that must be purchased for consumption or licensed for use.
  8. Services:
  A skill or set of skills provided in exchange for compensation. The service provider’s time can be purchased for a fee.

The Roots of E-Commerce – E-Commerce History

- EDI
  - Uses private communications networks (VANs) to transmit standardized transaction data
- Automating transactions using EDI
  - Drastically reduced the amount of paperwork and the need for human intervention
- Internet
  - Provided the ideal platform for conducting EDI transactions

FIGURE 8.3 • Electronic data interchange (EDI)

EDI uses private communications networks called value-added networks (VANs) to transmit standardized transaction data between business partners and suppliers.

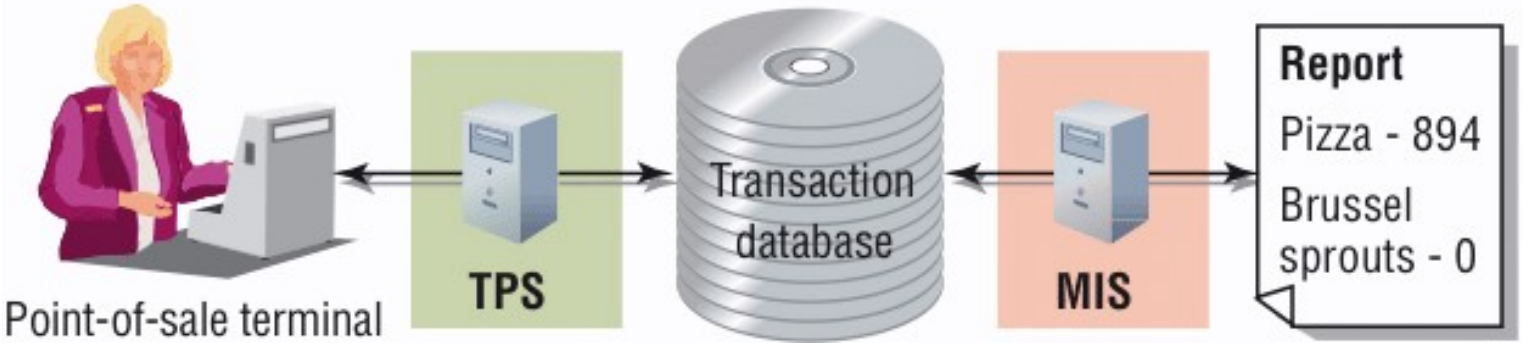


Transaction Processing

- Transaction
  - An exchange involving goods or services s
- Transaction processing system (TPS)
  - Information system used to support and record transactions
- Batch processing
  - Transactions are collected over time and processed together in batches
- Online transaction processing
  - Takes place at the point of sale

FIGURE 8.4 • The value of transaction processing

The transaction data collected through point-of-sale terminals can be used to assess which products are selling well and which are not.

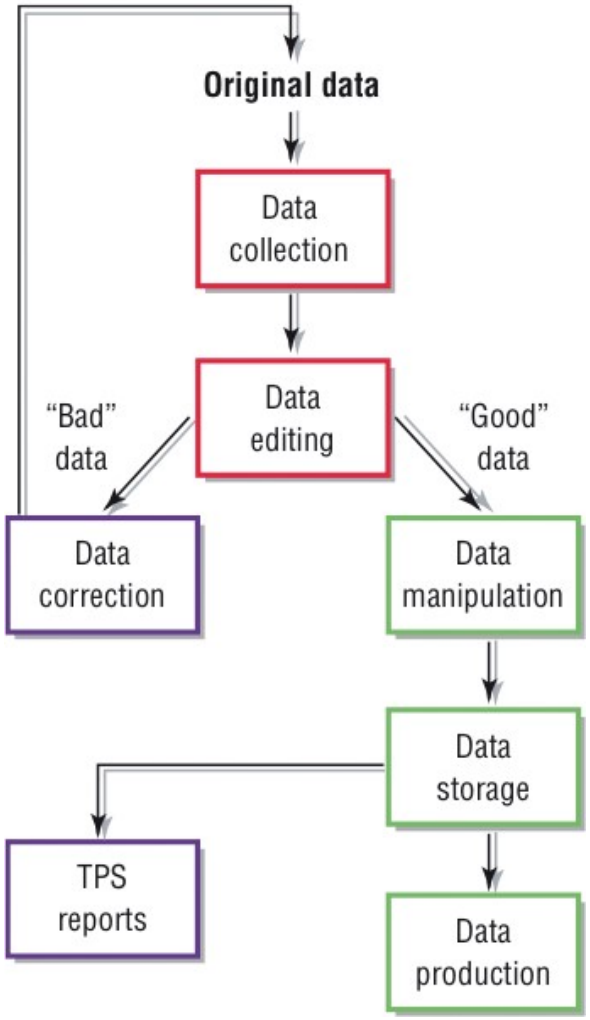


The Transaction Processing Cycle

- Data collection
  - The process of capturing transaction related data
- Data editing
  - Checking the validity of data entered
- Data correction
  - Implemented if an error is found in the entered data
- Data manipulation
  - Processing transaction data
- Data storage

FIGURE 8.5 • The transaction processing cycle

Data processing activities of a transaction processing system.

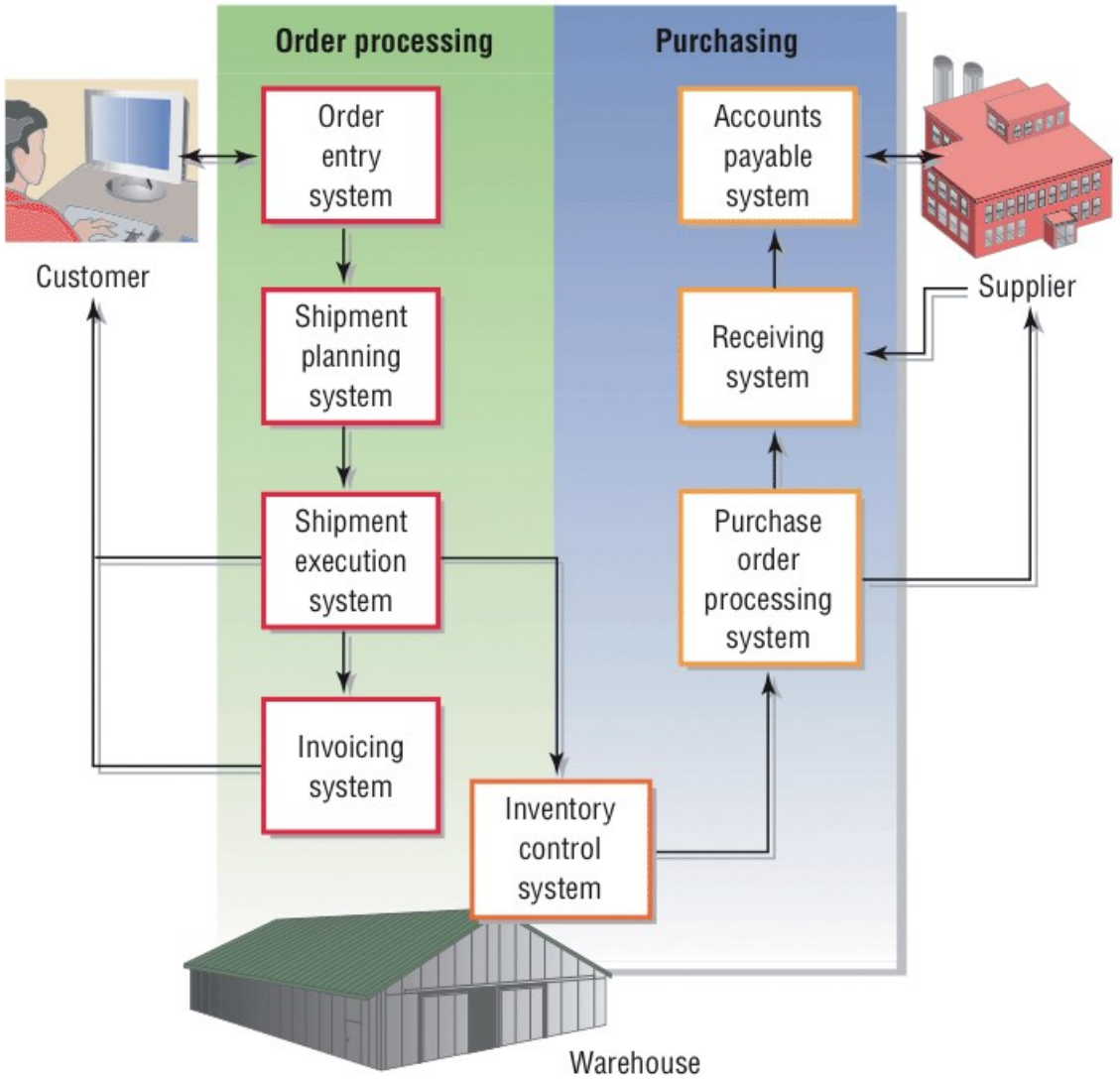


Different Transaction Processing for Different Needs

- Order processing system
  - Supports the sales of goods or services to customers
  - Arranges for shipment of products
- Purchasing system
  - Supports the purchase of goods and raw materials from suppliers

FIGURE 8.6 • Transaction processing system interaction

Transaction processing typically makes use of many interconnected systems and subsystems.



Overview of E-Commerce – Types of E-Commerce

- Business-to-consumer e-commerce (B2C)
  - Connects individual consumers with sellers
- Business-to-business e-commerce (B2B)
  - Supports business transactions across private networks, the Internet, and the Web
- Consumer-to-consumer e-commerce (C2C)
  - Connects individual sellers with people shopping for used items

FIGURE 8.7 • Business-to-consumer e-commerce

Peapod is a B2C service that allows customers in select cities to do their grocery shopping online and have their groceries on their doorstep within hours.

E-Commerce from the Buyer's Perspective

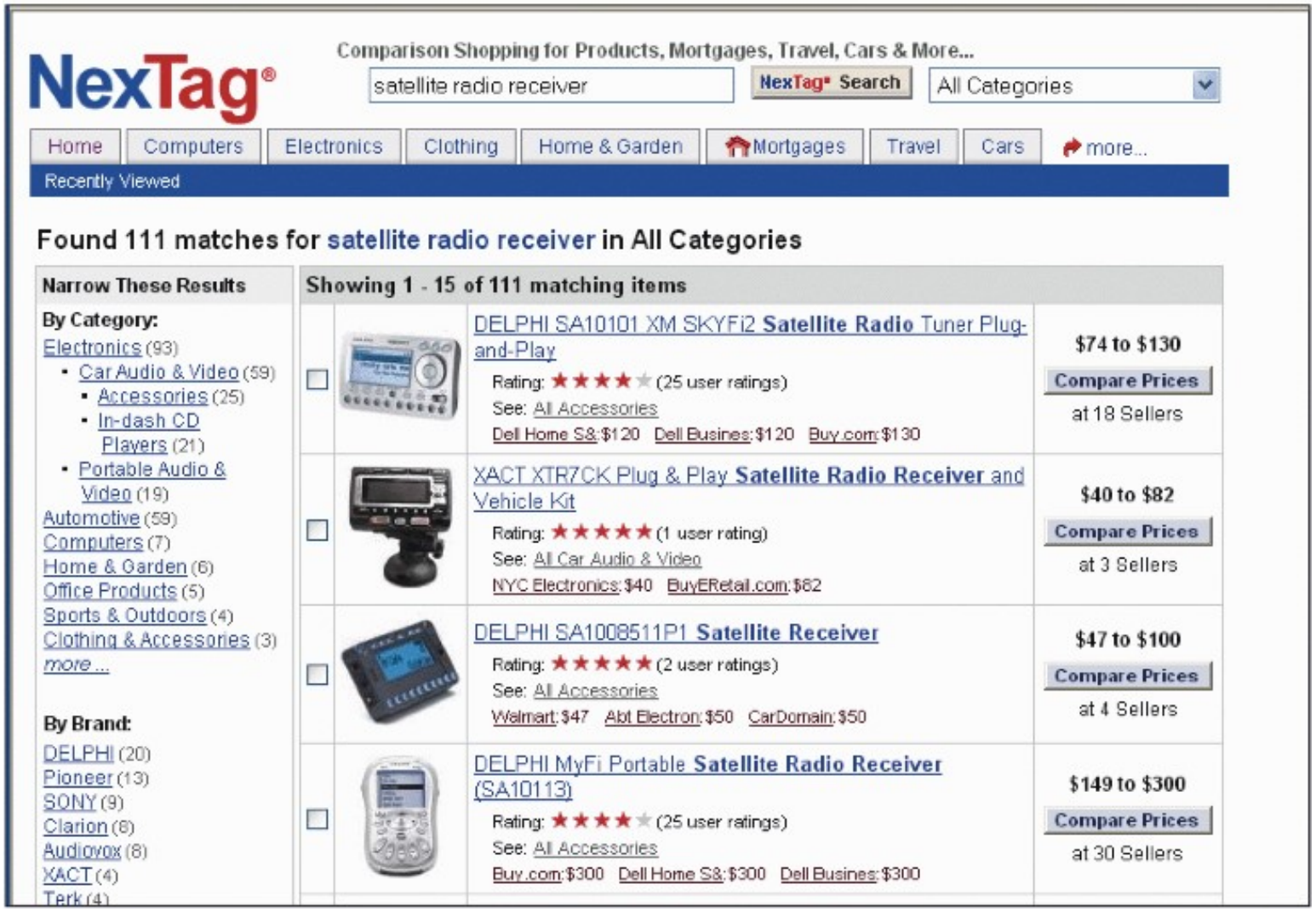
- Process of buying or acquiring goods or services
  - Realizing a need
  - Researching a product
  - Selecting a vendor
  - Providing payment
  - Accepting delivery
  - Using product support

FIGURE 8.9 • The six stages of buying goods

E-commerce can assist consumers with each of the six stages of the buying process.

FIGURE 8.10 • Comparison shopping on the Web

E-commerce empowers buyers with strong support of comparison shopping to find the best deal.



E-Commerce from the Seller's Perspective

- Sellers business practices
  - Market research to identify customer needs
  - Manufacturing products or supplying services that meet customer needs
  - Marketing and advertising to make customers aware of available products and services

E-Commerce from the Seller's Perspective (continued)

- Sellers business practices
  - Providing a method for acquiring payments
  - Making arrangements for delivery of the product
  - Providing after-sales support
- Supply chain management
  - Involves three areas of focus: demand planning, supply planning, and demand fulfillment

Benefits and Challenges of E-Commerce

- Buyers enjoy the convenience of shopping from their desktop
- B2C e-commerce
  - Levels the playing field between large and small businesses
- Challenges
  - Established businesses must alter systems and business practices
  - Social concerns

E-Commerce Applications

- E-Commerce
  - Playing an increasingly important role in our personal and professional lives
  - Allows us to discover new and interesting products
  - Allows us to find better deals
  - Used to monitor bank accounts and transfer electronic funds

Retail E-Commerce: Shopping Online

- E-tailing provides customers with
  - Product information
  - The ability to comparison shop
- E-tailing options
  - Set up an electronic storefront
  - Lease space in a cybermall

FIGURE 8.14 • mySimon

mySimon provides product price quotations from numerous e-tailers to help you find the best deal on many different products.

Online Clearing Houses, Web Auctions, and Marketplaces

- Provide a platform for businesses and individuals to sell their products and belongings
- www.ubid.com
  - Provides a method for manufacturers to liquidate stock and consumers to find a good deal
- eBay.com
  - Most popular auction/marketplace

B2B Global Supply Management and Electronic Exchanges

- Global supply management (GSM)
  - Businesses can find the best deals on the global market
- Electronic exchange
  - Provides convenient centralized platform for B2B e-commerce
  - Promotes cooperation between competing companies

Marketing

- Web is used for
  - Unsolicited advertising
  - Access to product information through business Web sites
  - Market research

Banking, Finance, and Investment

- Online banking provides
  - Convenient access to bank balance information
  - Ability to transfer funds, pay bills, and obtain account histories
- Electronic funds transfer
  - Popular for paying bills and receiving paychecks
- Online brokerages
  - Able to execute trades fast, within seconds

Mobile Commerce

- A form of e-commerce
- Takes place over wireless mobile devices such as
  - Handheld computers and cell phones
- Presents unique opportunities and challenges

M-Commerce Technology

- Technologies and standards
  - Wireless Application Protocol (WAP)
  - Wireless Markup Language (WML)
  - Infrared or Bluetooth wireless networking technology

Types of M-Commerce Applications

- Methods for delivering m-commerce services
  - Directly from cell phone service providers
  - Via mobile Internet or Web applications
  - Using Short Message Service (SMS) text messaging or Multimedia Messaging Service (MMS)
  - Using short-range wireless technology, such as infrared

FIGURE 8.21 • Web-based m-commerce

Web-based m-commerce makes use of mobile Web browsers in cell phones and PDAs to support traditional e-commerce applications.

FIGURE 8.22 • Proximity payment system

Proximity payment systems such as Vivo store credit card information on your cell phone and transfer funds wirelessly to point-of-sale terminals.

E-Commerce Implementation

- Implementing e-commerce
  - Requires large investment and expertise
- E-Commerce host
  - Business that takes responsibility for setting up and maintaining an e-commerce system

FIGURE 8.23 • E-commerce host

A typical e-commerce host will set up and maintain an e-commerce system for around $49.95 per month.

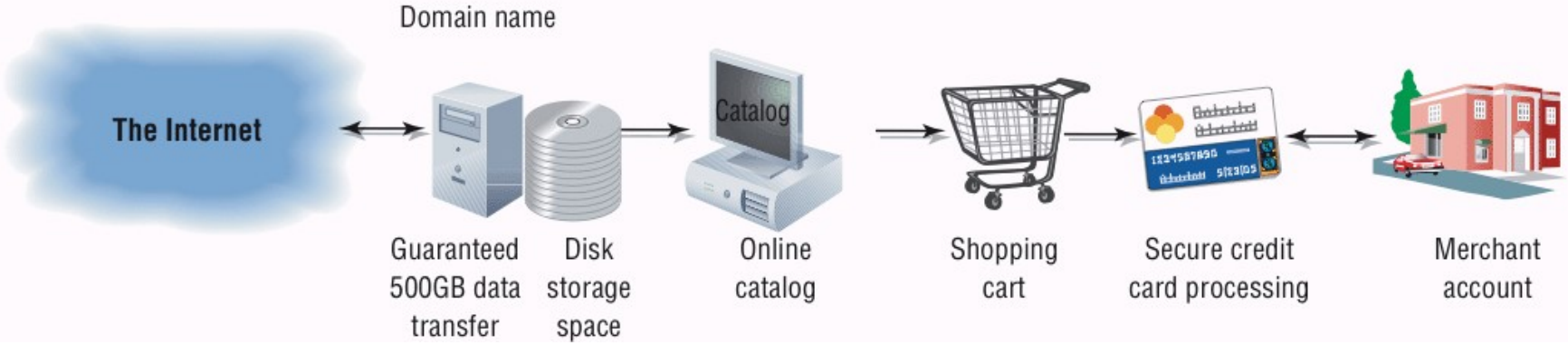
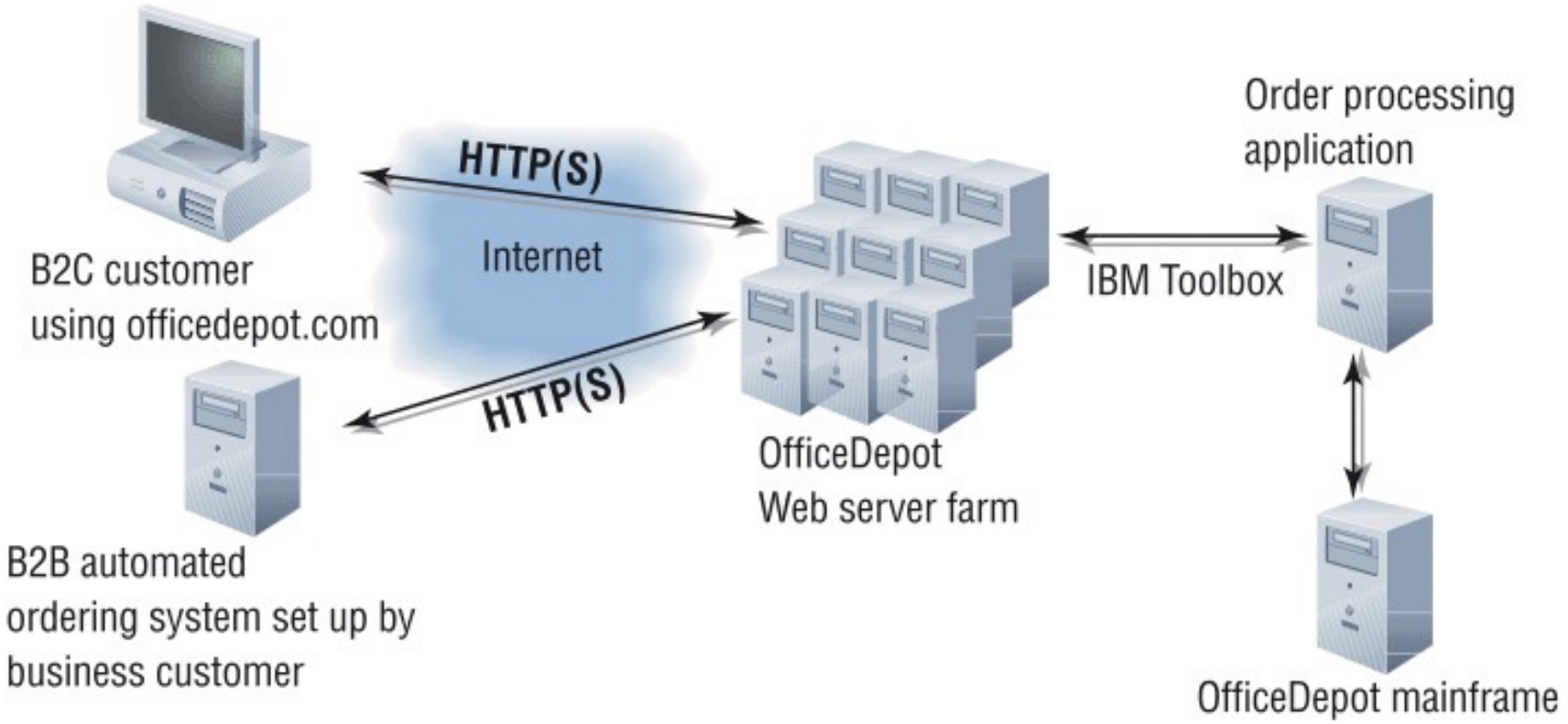


FIGURE 8.24 • Office Depot: A large e-commerce system

Office Depot contracted IBM to design this e-commerce system to support both B2C and B2B.



Infrastructure

- E-Commerce requires significant infrastructure changes
- B2C e-commerce
  - Often connects manufacturers directly with consumers, cutting out the middleman
  - Requires shipping individual products directly to consumers

Hardware and Networking

- Underestimating the amount of Web traffic
  - Leads to network stalls and long wait times
- Typical e-commerce Web site
  - Employs one or more server computers and a high-speed Internet connection
- Outsourcing to a Web hosting company
  - Can operate 24 hours a day, 7 days a week

Software

- Web Server Software
  - Responds to requests for Web pages
- Web Server Utility Programs
  - Provide statistical information about server usage and Web site traffic patterns
- E-Commerce Software
  - Supports e-commerce activities
  - Includes catalog management, electronic shopping cart, and payment software

Software (continued)

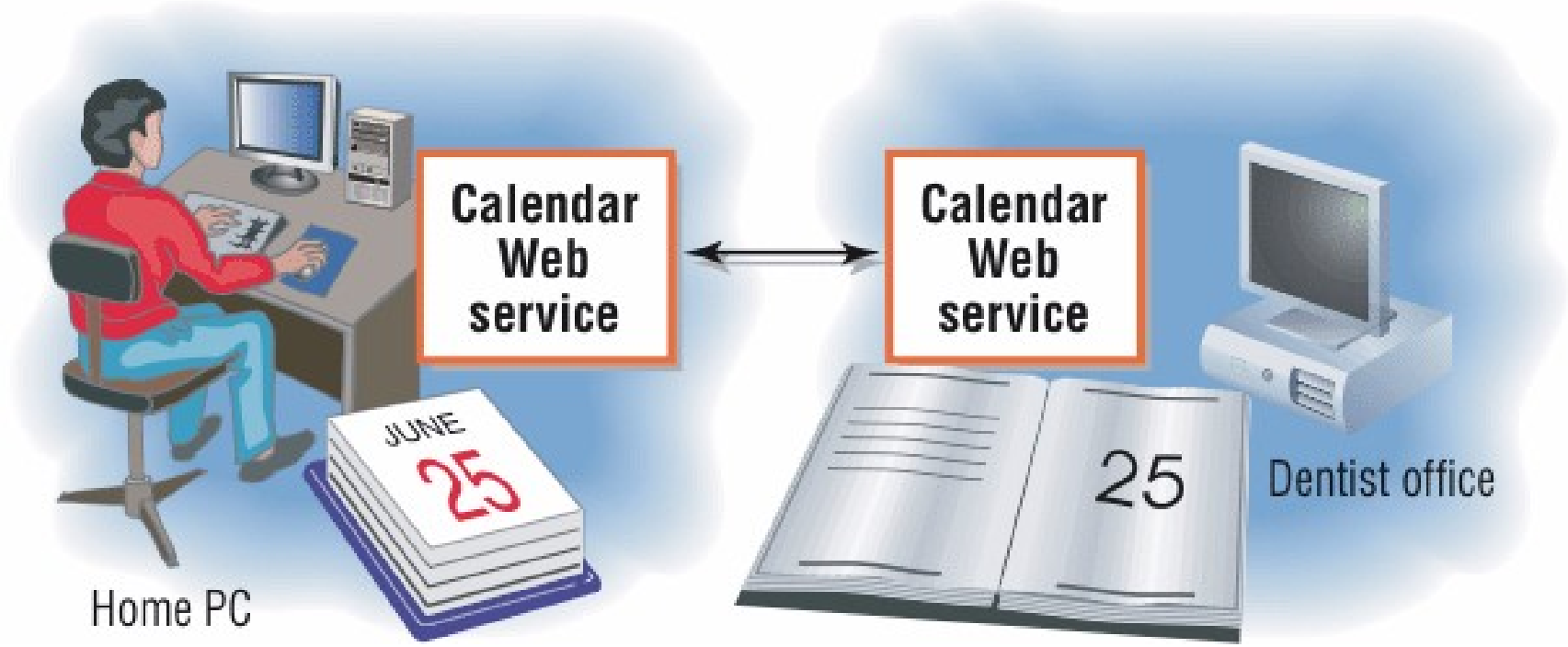
- Web Site Design Tools
  - What see what you-get (WYSIWYG) applications or wizards
- Graphics Applications
  - Design and create graphic elements of Web sites
- Web Site Development Tools
  - Application programming interfaces (API's)
    - Allow software engineers to develop Web-driven programs

Software (continued)

- Web services
  - Programs that automate tasks by communicating with each other over the Web
  - Systems developers can provide tools for automating trivial or repetitive tasks
  - Important in transaction processing

FIGURE 8.27 • Web services

A calendar Web service running on your home PC could interact with the calendar Web service installed on a computer in the dentist's office to allow you to make an appointment without the need to speak to a receptionist.



Building Traffic

- The 3Cs Approach
  - Content, community, and commerce
- Keywords and Search Engines
  - Choose name and product names that best describe business purpose and features
  - Select descriptive domain names
  - Business-related keywords can be listed in the HTML meta tag

Building Traffic (continued)

- Marketing
  - Online advertising methods include banner ads, pop-up ads, and e-mail
  - Offline advertising methods include magazines, newspapers, radio, and television

Electronic Payment Systems

- Electronic cash (e-cash or digital cash)
  - Provides a private and secure method of transferring funds
  - PayPal
    - Best-known e-cash provider
- E-cash benefits
  - Privacy - hides account information from vendors
  - Convenient if seller cannot process a credit card
- Smartcards
  - Credit cards with embedded microchips

International Markets

- Internet users of all nationalities will have access to your products
- First consideration of a global e-commerce strategy
  - Visitors of all nationalities and cultures should feel comfortable while viewing your Web content
- Costly approach
  - Create multiple versions of your Web site, each in a different language

E-Commerce Security Issues

- Digital certificate
  - A type of electronic business card
  - Attached to Internet transaction data
  - Verifies the sender of the data
  - Provided by certification authorities
  - Encryption
    - Uses high-level mathematical functions and computer algorithms to encode data

Summary

- E-Commerce
  - Systems that support electronically executed transactions
- Transaction processing system (TPS)
  - Supports and records transactions
- Three main types of e-commerce
  - Business-to-consumer (B2C)
  - Business-to-business (B2B)
  - Consumer-to-consumer (C2C)

Summary (continued)

- Retail Web sites
  - Allow consumers to comparison shop
- Mobile commerce
  - A form of e-commerce that takes place over wireless mobile devices
- E-Commerce
  - Requires investment in networking, hardware, and a wide variety of software
  - Requires changes in infrastructure

Information Technology Act, 2000

- In 1996, the United Nations Commission on International Trade Law (UNCITRAL) adopted the model law on electronic commerce (e-commerce) to bring uniformity in the law in different countries.
- Further, the General Assembly of the United Nations recommended that all countries must consider this model law before making changes to their own laws. India became the 12th country to enable cyber law after it passed the Information Technology Act, 2000.
- While the first draft was created by the Ministry of Commerce, Government of India as the ECommerce Act, 1998, it was redrafted as the 'Information Technology Bill, 1999', and passed in May 2000.

Objectives of the Act

- The Information Technology Act, 2000 provides legal recognition to the transaction done via electronic exchange of data and other electronic means of communication or electronic commerce transactions.
- This also involves the use of alternatives to a paper-based method of communication and information storage to facilitate the electronic filing of documents with the Government agencies.
- Further, this act amended the Indian Penal Code 1860, the Indian Evidence Act 1872, the Bankers' Books Evidence Act 1891, and the Reserve Bank of India Act 1934.

Objectives of the Act

The objectives of the Act are as follows:

- Grant legal recognition to all transactions done via electronic exchange of data or other electronic means of communication or e-commerce, in place of the earlier paper-based method of communication.
- Give legal recognition to digital signatures for the authentication of any information or matters requiring legal authentication
- Facilitate the electronic filing of documents with Government agencies and also departments
- Facilitate the electronic storage of data
- Give legal sanction and also facilitate the electronic transfer of funds between banks and financial institutions
- Grant legal recognition to bankers under the Evidence Act, 1891 and the Reserve Bank of India Act, 1934, for keeping the books of accounts in electronic form.

Features of the Information Technology Act, 2000

- All electronic contracts made through secure electronic channels are legally valid.
- Legal recognition for digital signatures.
- Security measures for electronic records and also digital signatures are in place
- A procedure for the appointment of adjudicating officers for holding inquiries under the Act is finalized

Features of the Information Technology Act, 2000

- Provision for establishing a Cyber Regulatory Appellant Tribunal under the Act. Further, this tribunal will handle all appeals made against the order of the Controller or Adjudicating Officer.
- An appeal against the order of the Cyber Appellant Tribunal is possible only in the High Court
- Digital Signatures will use an asymmetric cryptosystem and also a hash function

Features of the Information Technology Act, 2000

- Provision for the appointment of the Controller of Certifying Authorities (CCA) to license and regulate the working of Certifying Authorities. The Controller to act as a repository of all digital signatures.
- The Act applies to offences or contraventions committed outside India
- Senior police officers and other officers can enter any public place and search and arrest without warrant
- Provisions for the constitution of a Cyber Regulations Advisory Committee to advise the Central Government and Controller.

Applicability and Non-Applicability of the Act

- According to Section 1 (2), the Act extends to the entire country, which also includes Jammu and Kashmir. In order to include Jammu and Kashmir, the Act uses Article 253 of the constitution. Further, it does not take citizenship into account and provides extra-territorial jurisdiction.
- Section 1 (2) along with Section 75, specifies that the Act is applicable to any offence or contravention committed outside India as well. If the conduct of person constituting the offence involves a computer or a computerized system or network located in India, then irrespective of his/her nationality, the person is punishable under the Act.
- Lack of international cooperation is the only limitation of this provision.

Non-Applicability

- According to Section 1 (4) of the Information Technology Act, 2000, the Act is not applicable to the following documents:
- Execution of Negotiable Instrument under Negotiable Instruments Act, 1881, except cheques.
- Execution of a Power of Attorney under the Powers of Attorney Act, 1882.
- Creation of Trust under the Indian Trust Act, 1882.

Non-Applicability

- Execution of a Will under the Indian Succession Act, 1925 including any other testamentary disposition
  by whatever name called.
- Entering into a contract for the sale of conveyance of immovable property or any interest in such property.
- Any such class of documents or transactions as may be notified by the Central Government in the Gazette.

Cyber crimes

- **Cyber crimes** are criminal offenses committed via the Internet or otherwise aided by various forms of computer technology, such as the use of online social networks to bully others or sending sexually explicit digital photos with a smart phone.
- **Cybercrime**, also called **computer crime**, the use of a computer as an instrument to further illegal ends, such as committing fraud, trafficking in child pornography and intellectual property, stealing identities, or violating privacy. Cybercrime, especially through the Internet, has grown in importance as the computer has become central to commerce, entertainment, and government.

Digital Signature

- A digital signature is a mathematical technique used to validate the authenticity and integrity of a message, software or digital document. As the digital equivalent of a handwritten signature or stamped seal, a digital signature offers far more inherent security, and it is intended to solve the problem of tampering and impersonation in digital communications.

Digital Signature- Contd.

- Digital signatures can provide the added assurances of evidence of origin, identity and status of an electronic document, transaction or message and can acknowledge informed consent by the signer.
- In many countries, including the United States, digital signatures are considered legally binding in the same way as traditional document signatures.

How digital signatures work

- Digital signatures are based on public key cryptography, also known as asymmetric cryptography. Using a public key algorithm, such as RSA, one can generate two keys that are mathematically linked: one private and one public. (for more on
- Digital signatures work because public key cryptography depends on two mutually authenticating cryptographic keys. The individual who is creating the digital signature uses their own private key to encrypt signature-related data; the only way to decrypt that data is with the signer's public key. This is how digital signatures are authenticated.

How digital signatures work Contd.

- Digital signature technology requires all the parties to trust that the individual creating the signature has been able to keep their own private key secret. If someone else has access to the signer's private key, that party could create fraudulent digital signatures in the name of the private key holder.

How to create a digital signature

- To create a digital signature, signing software -- such as an email program -- creates a one-way hash of the electronic data to be signed. The private key is then used to encrypt the hash. The encrypted hash -- along with other information, such as the hashing algorithm -- is the digital signature.
- The reason for encrypting the hash instead of the entire message or document is that a hash function can convert an arbitrary input into a fixed length value, which is usually much shorter. This saves time as hashing is much faster than signing.
- The value of a hash is unique to the hashed data. Any change in the data, even a change in a single character, will result in a different value. This attribute enables others to validate the integrity of the data by using the signer's public key to decrypt the hash.

How to create a digital signature- Contd.

- If the decrypted hash matches a second computed hash of the same data, it proves that the data hasn't changed since it was signed. If the two hashes don't match, the data has either been tampered with in some way -- integrity -- or the signature was created with a private key that doesn't correspond to the public key presented by the signer -- authentication.
- A digital signature can be used with any kind of message -- whether it is encrypted or not -- simply so the receiver can be sure of the sender's identity and that the message arrived intact. Digital signatures make it difficult for the signer to deny having signed something -- assuming their private key has not been compromised -- as the digital signature is unique to both the document and the signer and it binds them together. This property is called nonrepudiation.

How to create a digital signature-Contd.

- Digital signatures are not to be confused with digital certificates. A digital certificate, an electronic document that contains the digital signature of the issuing certificate authority, binds together a public key with an identity and can be used to verify that a public key belongs to a particular person or entity.
- Most modern email programs support the use of digital signatures and digital certificates, making it easy to sign any outgoing emails and validate digitally signed incoming messages. Digital signatures are also used extensively to provide proof of authenticity, data integrity and nonrepudiation of communications and transactions conducted over the internet.

Classes of digital signatures

There are three different classes of Digital Signature Certificates:

- **Class 1:** Cannot be used for legal business documents as they are validated based only on an email ID and username. Class 1 signatures provide a basic level of security and are used in environments with a low risk of data compromise.
- **Class 2**: Often used for e-filing of tax documents, including income tax returns and Goods and Services Tax (GST) returns. Class 2 digital signatures authenticate a signee's identity against a pre-verified database. Class 2 digital signatures are used in environments where the risks and consequences of data compromise are moderate.

Classes of digital signatures

There are three different classes of Digital Signature Certificates:

- **Class 3:** The highest level of digital signatures. Class 3 signatures require a person or organization to present in front of a certifying authority to prove their identity before signing. Class 3 digital signatures are used for e-auctions, e-tendering, e-ticketing, court filings and in other environments where threats to data or the consequences of a security failure are high.

Uses of digital signatures

Industries use digital signature technology to streamline processes and improve document integrity. Industries that use digital signatures include:

- **Government** - The U.S. Government Publishing Office publishes electronic versions of budgets, public and private laws and congressional bills with digital signatures. Digital signatures are used by governments worldwide for a variety of uses, including processing tax returns, verifying business-to-government (B2G) transactions, ratifying laws and managing contracts. Most government entities must adhere to strict laws, regulations and standards when using digital signatures.
- **Healthcare** - Digital signatures are used in the healthcare industry to improve the efficiency of treatment and administrative processes, to strengthen data security, for e-prescribing and hospital admissions. The use of digital signatures in healthcare must comply with the Health Insurance Portability and Accountability Act of 1996 (HIPAA).

Uses of digital signatures

- **Manufacturing** - Manufacturing companies use digital signatures to speed up processes, including product design, quality assurance (QA), manufacturing enhancements, marketing and sales. The use of digital signatures in manufacturing is governed by the International Organization for Standardization (ISO) and the National Institute of Standards and Technology (NIST) Digital Manufacturing Certificate (DMC).
- **Financial services** - The U.S. financial sector uses digital signatures for contracts, paperless banking, loan processing, insurance documentation, mortgages, and more. This heavily regulated sector uses digital signatures with careful attention to the regulations and guidance put forth by the Electronic Signatures in Global and National Commerce Act (E-Sign Act), state UETA regulations, the Consumer Financial Protection Bureau (CFPB) and the Federal Financial Institutions Examination Council (FFIEC).