



E-Commerce Notes

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Chapter 1. Introduction to E-Commerce

What is E-Commerce?

- E-commerce involves digitally enabled commercial transactions between and among organizations and individuals.
- Digitally enabled transactions include all those mediated by digital technology, meaning, for the most part, transactions that occur over the Internet, the Web, and/or via mobile devices. Commercial transactions involve the exchange of value (e.g., money) across organizational or individual boundaries in return for products or services.
- It is a methodology of modern business which addresses the need of business organizations, vendors and customers to reduce cost and improve the quality of goods and services while increasing the speed of delivery.
- It is a transaction of buying or selling online. It draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems.

Comparison of E-Commerce and Traditional Commerce

Basis for Comparison	Traditional Commerce	E-Commerce
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Meaning	Traditional commerce is a branch of business which focuses on the exchange of products and services, and includes all those activities which encourages exchange, in some way or the other.	E-commerce means carrying out commercial transactions or exchange of information, electronically on the internet.
Processing of Transactions	Manual	Automatic
Accessibility	Limited Time	24 × 7 × 365
Physical inspection	Goods can be inspected physically before purchase.	Goods cannot be inspected physically before purchase.
Customer interaction	Face-to-face	Screen-to-face
Scope of business	Limited to particular area.	Worldwide reach
Information exchange	No uniform platform for exchange of information.	Provides a uniform platform for information exchange.
Resource focus	Supply side	Demand side
Business Relationship	Linear	End-to-end
Marketing	One way marketing	One-to-one marketing
Payment	Cash, cheque, credit card, etc.	Credit card, fund transfer etc.
Delivery of goods	Instantly	Takes time

E-Commerce vs. E-Business

- E-business refers to the digital enabling of transactions and processes within a firm, involving information systems under the control of the firm.
- For the most part, e-business does not include commercial transactions involving an exchange of value across organizational boundaries.

Basis for Comparison	E-Commerce	E-Business
Meaning	Trading of merchandise, over the internet is known as E-commerce.	Running business using the internet is known as E-business.
What is it?	Subset	Superset
Is it limited to monetary transactions?	Yes	No
What they carry out?	Commercial transactions	Business transactions
Approach	Extroverted	Ambiverted
Requires	Website	Website, CRM, ERP, etc.
Which network is used?	Internet	Internet, Intranet and Extranet.

8 Unique Features of E-Commerce

E-Commerce Technology Dimension	Business Significance
<u>Ubiquity</u> – E-commerce technology is available everywhere: at work, at home, and elsewhere via mobile devices, anytime.	The marketplace is extended beyond traditional boundaries and is removed from a temporal and geographic location. “Marketspace” is created; shopping can take place anywhere. Customer convenience is enhanced, and shopping costs are reduced.
<u>Global reach</u> – The technology reaches across national boundaries, around the earth.	Commerce is enabled across cultural and national boundaries seamlessly and without modification. “Marketspace” includes potentially billions of consumers and millions of businesses worldwide.
<u>Universal standards</u> – There is one set of technology standards.	There is a common, inexpensive, global technology foundation for businesses to use.
<u>Richness</u> –Video, audio, and text messages are possible.	Video, audio, and text marketing messages are integrated into a single marketing message and consuming experience.
<u>Interactivity</u> – The technology works through interaction with the user.	Consumers are engaged in a dialog that dynamically adjusts the experience to the individual, and makes the consumer a co-participant in the process of delivering goods to the market.
<u>Information density</u> – The technology reduces information costs and raises	Information processing, storage, and communication costs drop dramatically, while currency,

quality.	accuracy, and timeliness improve greatly. Information becomes plentiful, cheap, and accurate.
<u>Personalization / Customization</u> – The technology allows personalized messages to be delivered to individuals as well as groups.	Personalization of marketing messages and customization of products and services are based on individual characteristics.
<u>Social technology</u> – User-generated content and social networks.	New online social and business models enable user content creation and distribution, and support social networks.

Essential Features of an E-commerce Website

The success of an e-commerce website relies on the presence of a holistic approach that is to be followed by the company to ensure seamless integration among the various key features that the consumers have been conditioned to expect from any modern website.

Some of the essential features are:

→ Catalog Management

- ◆ Customers should be able to find what they are looking for without any hassle. This is made possible by Categories, Brands and Products segregation to provide a more convenient way for searching products.

→ Content Management

- ◆ With the vast amount of content that will be available on your e-commerce site, exploration of relevant content should not be difficult.
- ◆ This requires separation of Pages and Blogs. Homepage banners & intuitive navigation are required to browse efficiently.
- ◆ Automatic-email messages, Review Management, Comment Management provide a much richer experience for users.
- Customer and Order Management
- Discount and Promotion Management
- Wishlists
- Shopping Cart
- Related Items
- Analytics and Reports
 - ◆ With the ever-increasing size of data, there has to be a tangible way of visualizing and making sense of the intricacies of user interaction and mass demands.
 - ◆ This is made possible with Dashboards, Reports, Charts, Graphs and Diagrams that serve to value the statistics in a meaningful manner.
- Search Engine Optimization
 - ◆ Most users search e-commerce websites through search engines.
 - ◆ This requires dynamic and specific titles and meta information.
- Settings

- ◆ Shipping Options
- ◆ Payment Options
- ◆ Taxes & Locations
- ◆ Email Configuration

Evolution of E-Commerce

(1995–2000) INVENTION	(2001–2006) CONSOLIDATION	(2007–PRESENT) REINVENTION
Technology driven	Business driven	Mobile technology enables social, local, and mobile e-commerce
Revenue growth emphasis	Earnings and profits emphasis	Audience and social network connections emphasis
Venture capital financing	Traditional financing	Return of venture capital financing; buyouts of startups by large firms
Ungoverned	Stronger regulation and governance	Extensive government surveillance
Entrepreneurial	Large traditional firms	Entrepreneurial social, mobile, and local firms
Disintermediation	Strengthening intermediaries	Proliferation of small online intermediaries renting business processes of larger firms
Perfect markets	Imperfect markets, brands, and network effects	Continuation of online market imperfections; commodity competition in select markets

Pure online strategies	Mixed “bricks-and-clicks” strategies	Return of pure online strategies in new markets; extension of bricks-and-clicks in traditional retail markets
First-mover advantages	Strategic-follower strength; complementary assets	First-mover advantages return in new markets as traditional Web players catch up
Low-complexity retail products	High-complexity retail products and services	Retail, services, and content

Major Themes Underlying the Study of E-Commerce

- **Technology** – To understand e-commerce, you need a basic understanding of the information technologies upon which it is built, including the Internet, the Web, and mobile platform, and a host of complementary technologies—cloud computing, desktop computers, smartphones, tablet computers, local area networks, client/server computing, packet-switched communications, protocols such as TCP/IP, web servers, HTML, and relational and nonrelational databases, among others.
- **Business** – While technology provides the infrastructure, it is the business applications—the potential for extraordinary returns on investment—that create the interest and excitement in e-commerce. Therefore, you also need to understand some key business concepts such as electronic markets, information goods, business models, firm and

industry value chains, industry structure, and consumer behavior in digital markets.

- **Society** – Understanding the pressures that global e-commerce places on contemporary society is critical to being successful in the e-commerce marketplace. The primary societal issues are intellectual property, individual privacy, and public policy.

Advantages of E-Commerce

→ **Advantage to Customers**

- ◆ Convenience: every type of product can easily be searched for through online catalogues. Type in the product name or model and an organized list of websites that contain this product in their database will appear.
- ◆ Time-saving: you can purchase products or services while sitting at your home or office. There's no need to travel to the physical store to buy something (fuel is also saved).
- ◆ Variety and Comparison: there are countless products available to view and compare online. This can be done quickly and easily using the e-commerce and web design technologies.

→ **Advantage to Businesses**

- ◆ Increasing customer base: people from around the world have quick and easy access to the website. The cost to host a server on a worldwide base is not nearly as much as it would cost to expand a business physically to a worldwide base.
- ◆ Always operational: no matter the conditions outside, an internet user can access your website at any time from

almost anywhere. There is always a chance of gaining more customers and more profits.

- ◆ Instant transactions: with the conventional payment systems, it could take days for a payment to go through and for either of the parties to get what they need. E-commerce transactions are cleared immediately due to internet banking and other new age networked payment systems.

Disadvantages of E-Commerce

→ Disadvantage to Customers

- ◆ Privacy and Security: not every e-commerce website you use will be secure. Always be sure to check the security credentials of a website (check the URL to begin with). Ensure that you are providing your banking or other valuable details to trusted websites only.
- ◆ Quality and Intangibility: when buying something at an actual store, you can touch and feel the product. However, while shopping online you have to rely on the seller's promise or how he/she portrays the product. It is often the case that the product you chose and the actual product is quite different.
- ◆ Hidden Costs: extra hidden fees may show up on your bill and not on your initial payment page. Be sure that you know where your money is going. This tends to occur especially for international transactions.

→ Disadvantage to Businesses

- ◆ Security: no matter the efforts taken by the company to be as consumer friendly and as secure as possible, there will still be several malicious users out there looking to

intercept or gain unauthorized data or simply cause the website to crash so that no legitimate user can access it.

- ◆ Expense and Expertise for E-commerce Infrastructure: the requirement of skilled I.T. and business professionals is always there as it is needed for proper handling and maintenance of the website.
- ◆ Constant upkeep: to survive in today's market, any e-commerce venture would need to be ready to adapt to change no matter the cost. The systems that support the e-commerce and business operations may need constant upgrade or replacement. There may be extra overhead to keep databases and applications running.

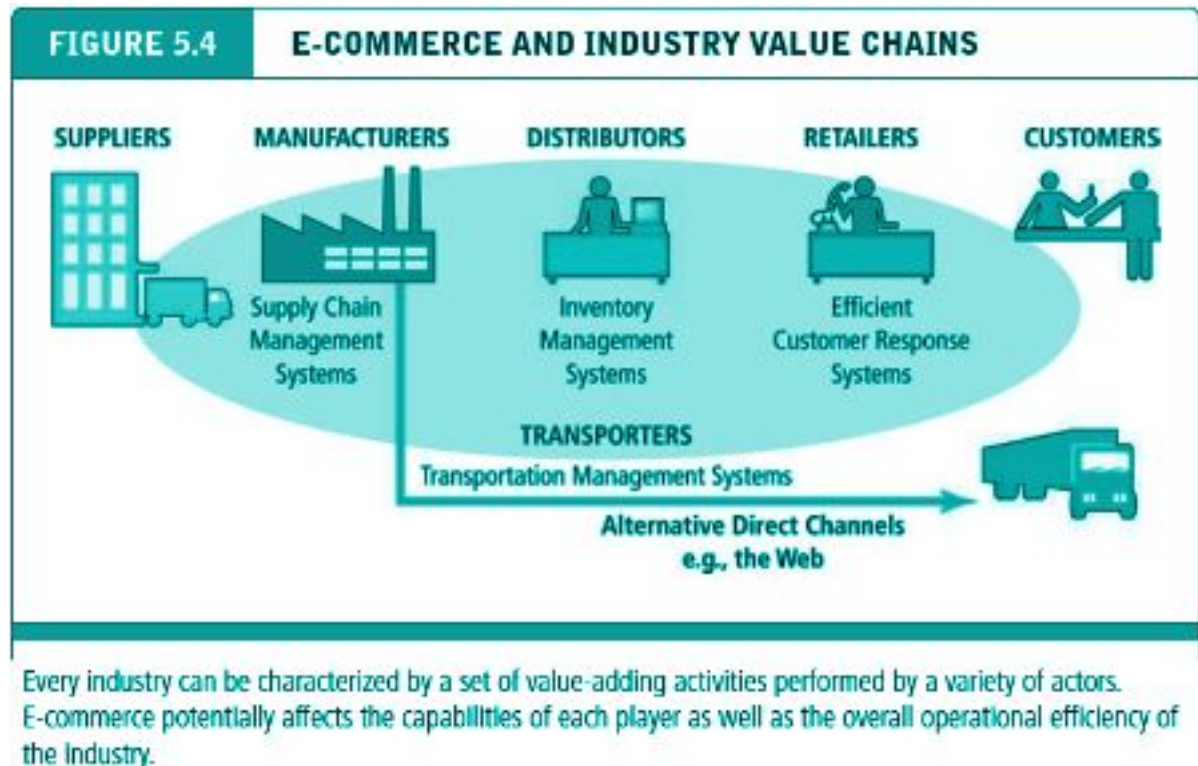
Overall Business Environment

Industry Structure



- Industry structure refers to the nature of the players in an industry and their relative bargaining power.
- An industry's structure is characterized by five forces:
 - ◆ rivalry among existing competitors
 - ◆ the threat of substitute products
 - ◆ barriers to entry into the industry
 - ◆ the bargaining power of suppliers
 - ◆ and the bargaining power of buyers
- When you describe an industry's structure, you are describing the general business environment in an industry and the overall profitability of doing business in that environment. E-commerce has the potential to change the relative strength of these competitive forces.

Industry Value Chains



- One of the basic tools for understanding the impact of information technology on industry and firm operations is the value chain.
- A value chain is the set of activities performed in an industry or in a firm that transforms raw inputs into final products and services.
- Each of these activities adds economic value to the final product; hence, the term value chain as an interconnected set of value-adding activities.

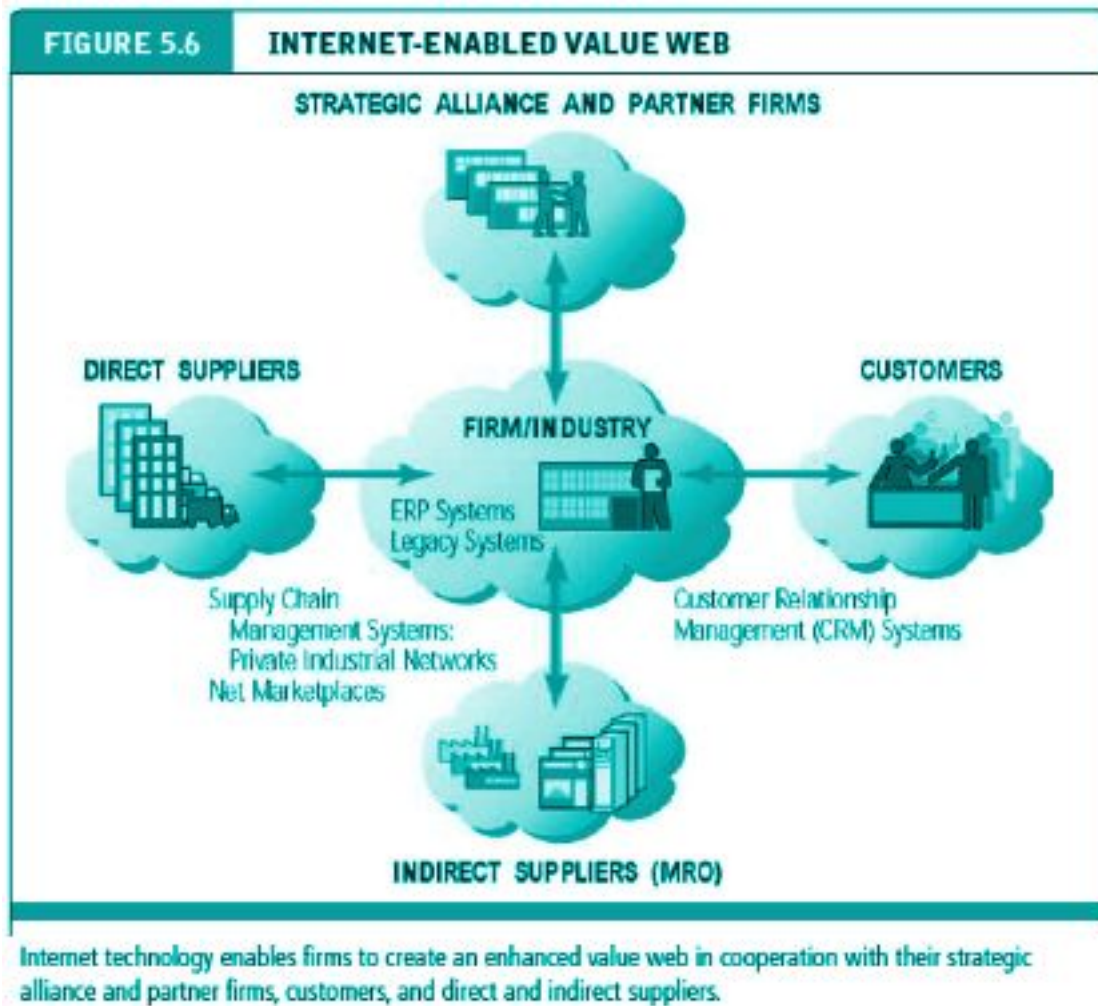
Firm Value Chains



Every firm can be characterized by a set of value-adding primary and secondary activities performed by a variety of actors in the firm. A simple firm value chain performs five primary value-adding steps: inbound logistics, operations, outbound logistics, sales and marketing, and after sales service.

- A firm value chain is the set of activities a firm engages in to create final products from raw inputs. Each step in the process of production adds value to the final product.
- In addition, firms develop support activities that coordinate the production process and contribute to overall operational efficiency.

Firm Value Webs



- While firms produce value through their value chains, they also rely on the value chains of their partners—their suppliers, distributors, and delivery firms.
- E-commerce creates new opportunities for firms to cooperate and create a value web. A value web is a networked business ecosystem that uses e-commerce technology to coordinate the value chains of business partners within an industry, or at the first level, to coordinate the value chains of a group of firms.
- A value web coordinates a firm's suppliers with its own production needs using an Internet-based supply chain management system.

Business Strategy

- A business strategy is a set of plans for achieving superior long-term returns on the capital invested in a business firm. A business strategy is therefore a plan for making profits in a competitive environment over the long term.
- There are four generic strategies for achieving a profitable business: differentiation, cost, scope, and focus. The specific strategies that a firm follows will depend on the product, the industry, and the marketplace where competition is encountered.
- Differentiation refers to all the ways producers can make their products or services unique and distinguish them from those of competitors. The opposite of differentiation is commoditization—a situation where there are no differences among products or services, and the only basis of choosing is price.
- Adopting a strategy of cost competition means a business has discovered some unique set of business processes or resources that other firms cannot obtain in the marketplace.
- A scope strategy is a strategy to compete in all markets around the globe, rather than merely in local, regional, or national markets.
- A focus/market niche strategy is a strategy to compete within a narrow market segment or product segment. This is a specialization strategy with the goal of becoming the premier provider in a narrow market.
- Another generic strategy is customer intimacy, which focuses on developing strong ties with customers.

Impacts of E-Commerce Features on Business Environment

→ Ubiquity

- ◆ Alters industry structure by creating new marketing channels and expanding size of overall market. Creates new efficiencies in industry operations and lowers costs of firms' sales operations. Enables new differentiation strategies.

→ Global reach

- ◆ Changes industry structure by lowering barriers to entry, but greatly expands market at same time. Lowers cost of industry and firm operations through production and sales efficiencies. Enables competition on a global scale.

→ Universal standards

- ◆ Changes industry structure by lowering barriers to entry and intensifying competition within an industry. Lowers costs of industry and firm operations by lowering computing and communications costs. Enables broad scope strategies.

→ Richness

- ◆ Alters industry structure by reducing strength of powerful distribution channels. Changes industry and firm operations costs by reducing reliance on sales forces. Enhances post-sales support strategies.

→ Interactivity

- ◆ Alters industry structure by reducing threat of substitutes through enhanced customization. Reduces industry and firm costs by reducing reliance on sales forces. Enables differentiation strategies.

→ Information density

- ◆ Changes industry structure by weakening powerful sales channels, shifting bargaining power to consumers. Reduces industry and firm operations costs by lowering costs of obtaining, processing, and distributing information about suppliers and consumers.
- Personalization/ Customization
 - ◆ Alters industry structure by reducing threats of substitutes, raising barriers to entry. Reduces value chain costs in industry and firms by lessening reliance on sales forces. Enables personalized marketing strategies.
- Social technologies
 - ◆ Changes industry structure by shifting programming and editorial decisions to consumers. Creates substitute entertainment products. Energizes a large group of new suppliers.

E-Commerce Business Models

- A business model is a set of planned activities (sometimes referred to as business processes) designed to result in a profit in a marketplace.
- A business model is not always the same as a business strategy, although in some cases they are very close insofar as the business model explicitly takes into account the competitive environment.
- The business model is at the center of the business plan. A business plan is a document that describes a firm's business model. A business plan always takes into account the competitive environment.

- An e-commerce business model aims to use and leverage the unique qualities of the Internet, the Web, and the mobile platform

Key Elements of A Business Model

→ Value Proposition

- ◆ A company's value proposition is at the very heart of its business model. A value proposition defines how a company's product or service fulfills the needs of customers.
- ◆ To develop and/or analyze a firm's value proposition, you need to understand why customers will choose to do business with the firm instead of another company and what the firm provides that other firms do not and cannot.
- ◆ From the consumer point of view, successful e-commerce value propositions include personalization and customization of product offerings, reduction of product search costs, reduction of price discovery costs, and facilitation of transactions by managing product delivery.

→ Revenue Model

- ◆ A firm's revenue model describes how the firm will earn revenue, generate profits, and produce a superior return on invested capital.
- ◆ The function of business organizations is both to generate profits and to produce returns on invested capital that exceed alternative investments.
- ◆ Profits alone are not sufficient to make a company "successful". In order to be considered successful, a firm

must produce returns greater than alternative investments.



REVENUE MODEL	EXAMPLES	REVENUE SOURCE
Advertising	Yahoo	Fees from advertisers in exchange for advertisements
Subscription	eHarmony, Consumer Reports Online, Netflix	Fees from subscribers in exchange for access to content or services
Transaction Fee	eBay, E*Trade	Fees (commissions) for enabling or executing a transaction
Sales	Amazon, L.L.Bean, Birchbox, iTunes	Sales of goods, information, or services
Affiliate	MyPoints	Fees for business referral

→ Market Opportunity

- ◆ The term market opportunity refers to the company's intended marketplace (i.e., an area of actual or potential commercial value) and the overall potential financial opportunities available to the firm in that marketplace.
- ◆ The market opportunity is usually divided into smaller market niches. The realistic market opportunity is defined by the revenue potential in each of the market niches where you hope to compete.

→ Competitive Environment

- ◆ A firm's competitive environment refers to the other companies selling similar products and operating in the same marketplace.
- ◆ It also refers to the presence of substitute products and potential new entrants to the market, as well as the power of customers and suppliers over your business.
- ◆ The competitive environment for a company is influenced by several factors: how many competitors are active, how large their operations are, what the market share of each competitor is, how profitable these firms are, and how they price their products. Firms typically have both direct and indirect competitors.
- ◆ Direct competitors are companies that sell very similar products and services into the same market segment. For example, Priceline and Travelocity, both of whom sell discount airline tickets online, are direct competitors because both companies sell identical products—cheap tickets.
- ◆ Indirect competitors are companies that may be in different industries but still compete indirectly because their products can substitute for one another. For instance, automobile manufacturers and airline companies operate in different industries, but they still compete indirectly because they offer consumers alternative means of transportation. CNN, a news outlet, is an indirect competitor of ESPN, not because they sell identical products, but because they both compete for consumers' time online.

→ **Competitive Advantage**

- ◆ Firms achieve a competitive advantage when they can produce a superior product and/or bring the product to

market at a lower price than most, or all, of their competitors.

- ◆ Firms also compete on scope. Some firms can develop global markets, while other firms can develop only a national or regional market. Firms that can provide superior products at the lowest cost on a global basis are truly advantaged.
- ◆ Firms achieve competitive advantages because they have somehow been able to obtain differential access to the factors of production that are denied to their competitors—at least in the short term. Perhaps the firm has been able to obtain very favorable terms from suppliers, shippers, or sources of labor. Or perhaps the firm has more experienced, knowledgeable, and loyal employees than any competitors. Maybe the firm has a patent on a product that others cannot imitate, or access to investment capital through a network of former business colleagues or a brand name and popular image that other firms cannot duplicate.
- ◆ An asymmetry exists whenever one participant in a market has more resources—financial backing, knowledge, information, and/or power—than other participants. Asymmetries lead to some firms having an edge over others, permitting them to come to market with better products, faster than competitors, and sometimes at lower cost.
- ◆ A first-mover advantage is a competitive market advantage for a firm that results from being the first into a marketplace with a serviceable product or service. If first movers develop a loyal following or a unique interface that is difficult to imitate, they can sustain their first-mover advantage for long periods.

- ◆ Some competitive advantages are called “unfair.” An unfair competitive advantage occurs when one firm develops an advantage based on a factor that other firms cannot purchase. For instance, a brand name cannot be purchased and is in that sense an “unfair” advantage. Brands are built upon loyalty, trust, reliability, and quality. Once obtained, they are difficult to copy or imitate, and they permit firms to charge premium prices for their products.
- ◆ In perfect markets, there are no competitive advantages or asymmetries because all firms have access to all the factors of production (including information and knowledge) equally.
- ◆ However, real markets are imperfect, and asymmetries leading to competitive advantages do exist, at least in the short term.

→ **Market Strategy**

- ◆ No matter how tremendous a firm’s qualities, its marketing strategy and execution are often just as important. The best business concept, or idea, will fail if it is not properly marketed to potential customers.
- ◆ Everything you do to promote your company’s products and services to potential customers is known as marketing.
- ◆ Market strategy is the plan you put together that details exactly how you intend to enter a new market and attract new customers.

→ **Organizational Development**

- ◆ In most cases, fast-growth companies—especially e-commerce businesses—need employees and a set of business procedures. In short, all firms—new ones in

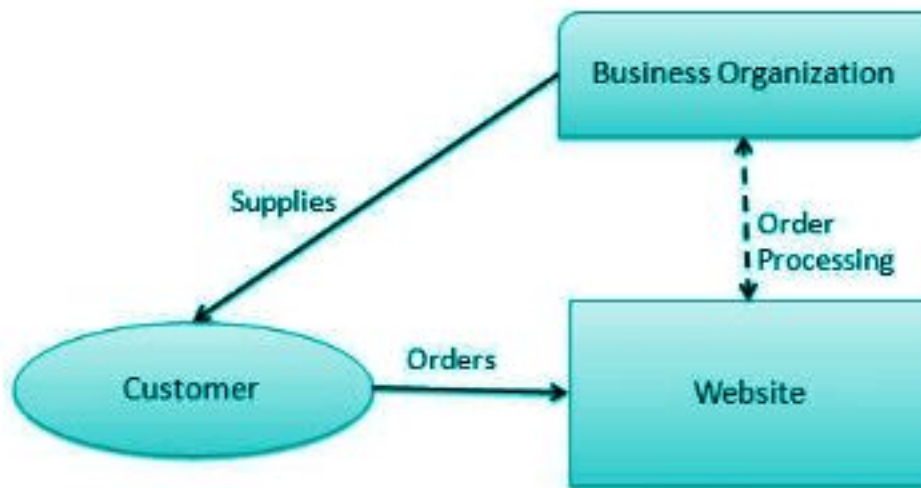
particular—need an organization to efficiently implement their business plans and strategies.

- ◆ Typically, work is divided into functional departments, such as production, shipping, marketing, customer support, and finance. Jobs within these functional areas are defined, and then recruitment begins for specific job titles and responsibilities.
- ◆ Typically, in the beginning, generalists who can perform multiple tasks are hired. As the company grows, recruiting becomes more specialized.

→ **Management Team**

- ◆ Arguably, the single most important element of a business model is the management team responsible for making the model work.
- ◆ A strong management team gives a model instant credibility to outside investors, immediate market-specific knowledge, and experience in implementing business plans.
- ◆ A strong management team may not be able to salvage a weak business model, but the team should be able to change the model and redefine the business as it becomes necessary.
- ◆ The challenge is to find people who have both the experience and the ability to apply that experience to new situations.

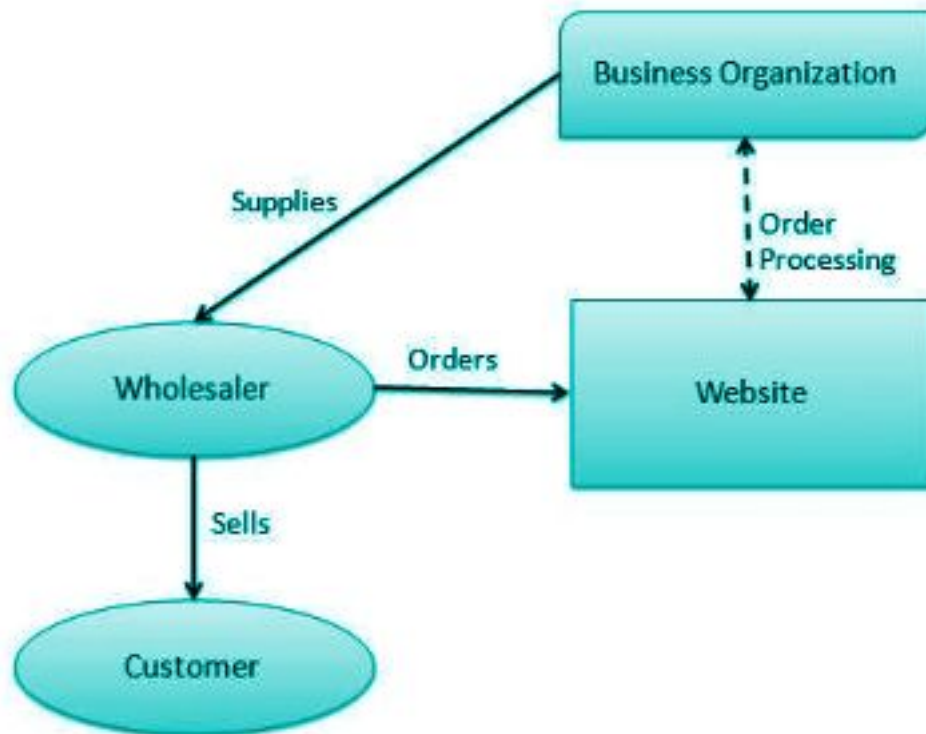
B2C (Business-to-Consumer)



- A website following B2C business model sells its product directly to a customer. A customer can view products shown on the website of business organization. The customer can choose a product and order the same. Website will send a notification to the business organization via email and organization will dispatch the product/goods to the customer.
- B2C commerce includes purchases of retail goods, travel services, and online content.
- Within the B2C category, there are many different types of business models such as subscription, advertisement, sales, PPC, affiliate, etc.
- The various business models in B2C are:
 - ◆ E-tailer: online version of a retail store, where consumers can shop at any time of the day or night without leaving their home or office (Amazon, iTunes). Revenue model: Sale of goods.

- ◆ Community provider: sites where individuals with particular interests, hobbies, common experiences, or social networks can come together and meet online (Facebook, Twitter). Revenue model: Advertising, subscription, affiliate referral fees.
- ◆ Content provider: information and entertainment providers such as newspapers, sports sites, and other sources that offer customers up-to date news and special how-to guidance and tips (CNN.com, ESPN.com). Revenue model: Advertising, subscription fees, sales of digital goods.
- ◆ Portal: offers an integrated package of content , contentsearch and social network services; news, email, chat, music downloads etc. (Yahoo, Google) Revenue model: Advertising, subscription fees, transaction fees, affiliate referral.
- ◆ Transaction broker: processors of online sales transactions, such as Stockbrokers and travel agents, that increase customers' productivity by helping them get things done faster and more cheaply (Expedia, Monster). Revenue model: Transaction fees.
- ◆ Market creator: businesses that use internet technology to create markets that bring buyers and sellers together
- ◆ Service provider: companies that make money by selling users a service, rather than a product (Carbonite, RocketLawyer). Revenue model: Transaction fees.

B2B (Business-to-Business)



- A website following B2B business model sells its product to an intermediate buyer who then sells the product to the final customer.
- As an example, a wholesaler places an order from a company's website and after receiving the consignment, sells the end product to final customer who comes to buy the product at wholesaler's retail outlet.
- It works through many web portals that have had a directory or list of products, suppliers, manufacturers, traders, distributors and wholesalers of all kinds of products across the world so that it helps buyers and suppliers to connect with each other across the globe.

→ The business models for B2B are:

◆ **Net Marketplace**

- E-distributor: Single-firm online version of retail and wholesale store; supply maintenance, repair, operation goods; indirect inputs. Revenue Model: Sales of goods. Example: Grainger, Amazon Business.
- E-procurement: Single firm creating digital markets where sellers and buyers transact for indirect inputs. Revenue model: Fees for market-making services, supply chain management, and fulfillment services. Example: Ariba Supplier Network, PerfectCommerce.
- Exchange: Independently owned vertical digital marketplace for direct inputs. Revenue Models: Fees and commissions on transactions. Example: Go2Paper.
- Industry Consortium: Industry-owned vertical digital market open to select suppliers. Revenue model: Fees and commissions on transactions. Example: TheSeam, SupplyOn.

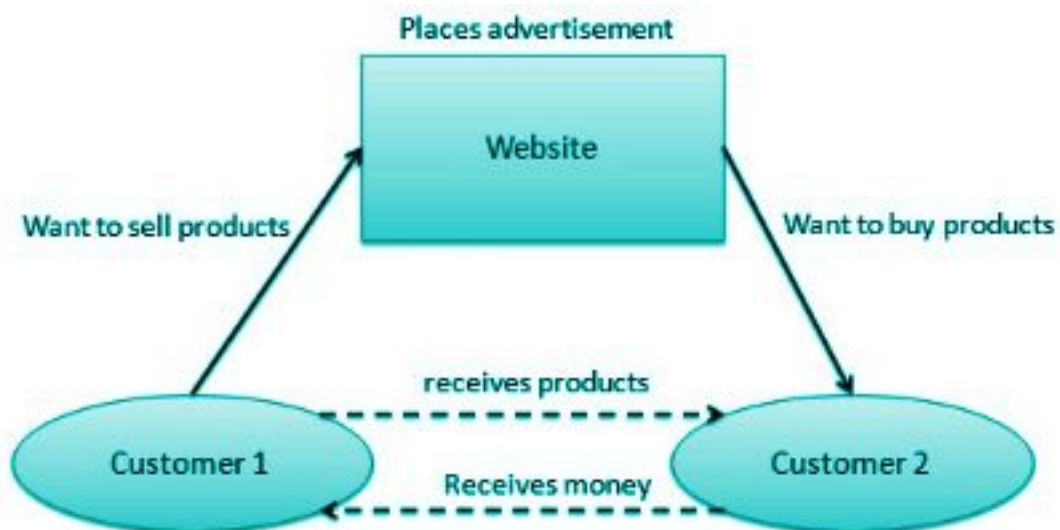
◆ **Private Industrial Network**

- Company-owned network that coordinates supply chains with a limited set of partners. Cost is absorbed by network owner and recovered through production and distribution efficiencies. Example: Walmart, Procter & Gamble(P&G).

→ Examples:

- ◆ Alibaba.com is the leading platform for global wholesale trade.
- ◆ IndiaTradeZone.com is a B2B portal for exporters & importers to explore new markets and increase their international business in a simple, cost effective manner.
- ◆ Go2Paper is an independent third-party marketplace that serves the paper industry

C2C (Consumer-to-Consumer)



- In C2C e-commerce, the consumer prepares the product for market, places the product for auction or sale, and relies on the market maker to provide catalog, search engine, and transaction clearing capabilities so that products can be easily displayed, discovered, and paid for.
- Auction sites such as eBay, and listing sites such as Craigslist, enable consumers to auction or sell goods directly to other consumers.

- Airbnb and Uber provide similar platforms for services such as room rental and transportation.

C2B (Consumer-to-Business)

- Consumer-to-business (C2B) is a business model in which consumers (individuals) create value and businesses consume that value.
- Accepted concepts are crowdsourcing and co-creation.
- C2B model, also called a reverse auction or demand collection model, enables buyers to name or demand their own price, which is often binding, for a specific good or service. The website collects the demand bids and then offers the bids to participating sellers.
- Another form of C2B is the electronic commerce business model in which consumers can offer products and services to companies, and the companies pay the consumers. This business model is a complete reversal of the traditional business model in which companies offer goods and services to consumers (B2C).
- We can see the C2B model at work in blogs or internet forums in which the author offers a link back to an online business thereby facilitating the purchase of a product (like a book on Amazon.com), for which the author might receive affiliate revenues from a successful sale. Elance was the first C2B model e-commerce site.

P2P (Peer-to-Peer)

- A Peer-to-Peer, or P2P, Economy is a decentralized model whereby two individuals interact to buy or sell goods and

services directly with each other, without intermediation by a third-party, or without the use of a company of business. The buyer and the seller transact directly with each other. Because of this, the producer owns both their tools (or means of production) and their finished product.

- Services like Uber or Airbnb serve as alternatives to taxi and delivery services or hotels and inns.

Local Commerce

- Local merchants use a variety of online marketing techniques to drive consumers to their stores.
- Groupon offers subscribers daily deals from local businesses in the form of Groupons, discount coupons that take effect once enough subscribers have agreed to purchase.

Mobile Commerce

- Refers to the use of mobile devices to enable online transactions. M-commerce involves the use of cellular and wireless networks to connect laptops, smartphones such as the iPhone and Android phones, and tablet computers such as the iPad to the Internet
- Once connected, mobile consumers can conduct transactions, including stock trades, in-store price comparisons, banking, travel reservations, and more.
- Companies such as Flipkart, Amazon, Myntra, Snapdeal all have mobile applications that enable customers to shop natively from their mobile.

Social Commerce

- Social commerce is a subset of electronic commerce that involves social media, online media that supports social

interaction, and user contributions to assist online buying and selling of products and services.

- The growth of social e-commerce is being driven by a number of factors, including the increasing popularity of social sign-on (signing onto websites using your Facebook or other social network ID), network notification (the sharing of approval or disapproval of products, services, and content via Facebook's Like button or Twitter tweets), online collaborative shopping tools, and social search (recommendations from online trusted friends).
- Facebook is both the leading social network and social e-commerce site.



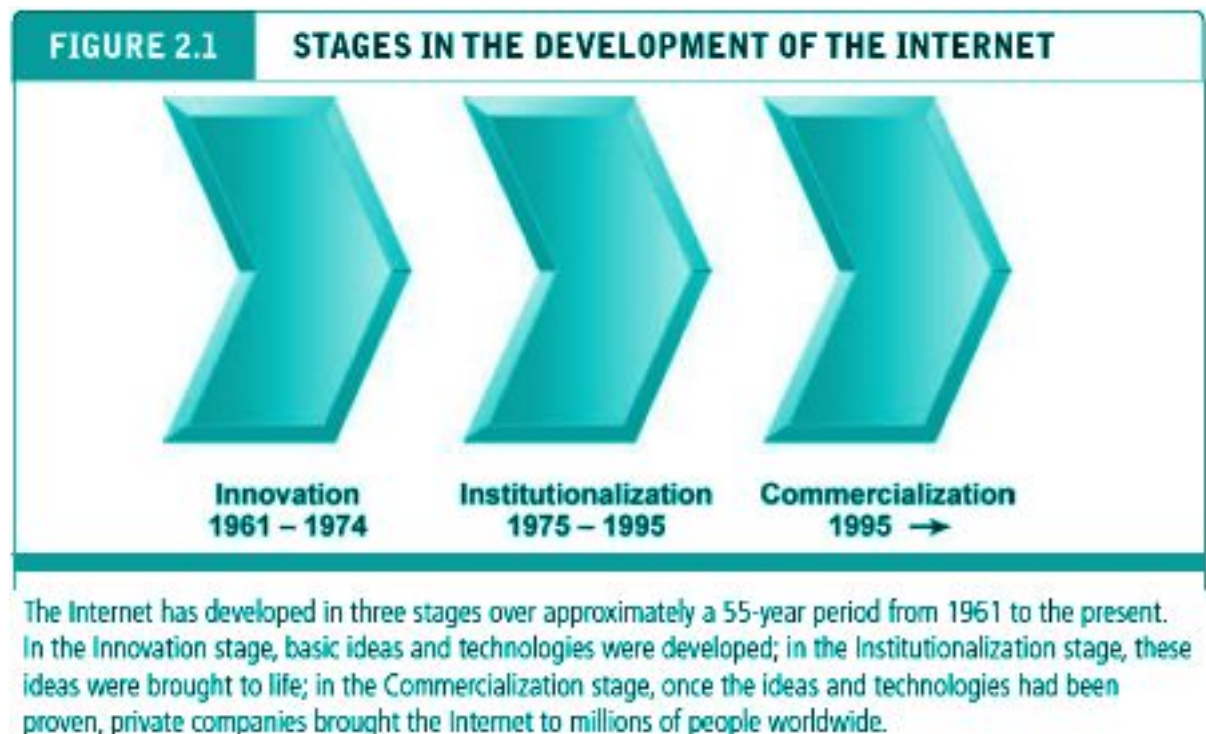
Chapter 2. Technology Infrastructure for E-Commerce

The Internet

- The Internet is an interconnected network of thousands of networks and millions of computers (sometimes called host computers or just hosts) linking businesses, educational institutions, government agencies, and individuals.
- The Internet provides approximately 3.1 billion people around the world with services such as email, apps, newsgroups, shopping, research, instant messaging, music, videos, and news.

- No single organization controls the Internet or how it functions, nor is it owned by anybody, yet it has provided the infrastructure for a transformation in commerce, scientific research, and culture.
- The word Internet is derived from the word internetwork, or the connecting together of two or more computer networks.
- The Web is one of the Internet's most popular services, providing access to billions, perhaps trillions, of web pages, which are documents created in a programming language called HTML that can contain text, graphics, audio, video, and other objects, as well as "hyperlinks" that permit users to jump easily from one page to another. web pages are navigated using browser software.

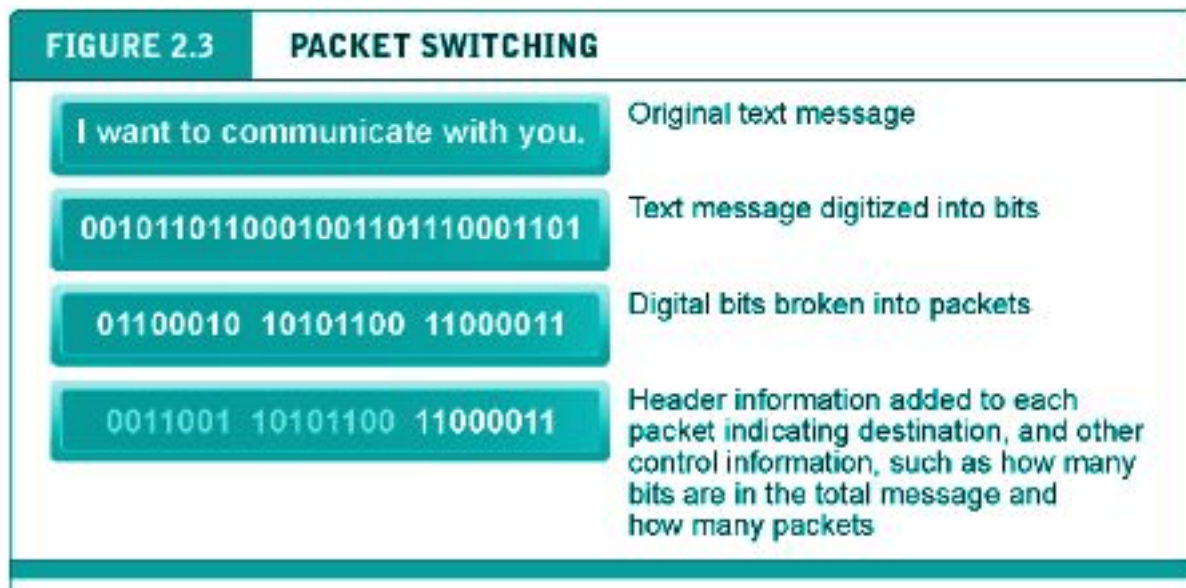
Evolution of the Internet



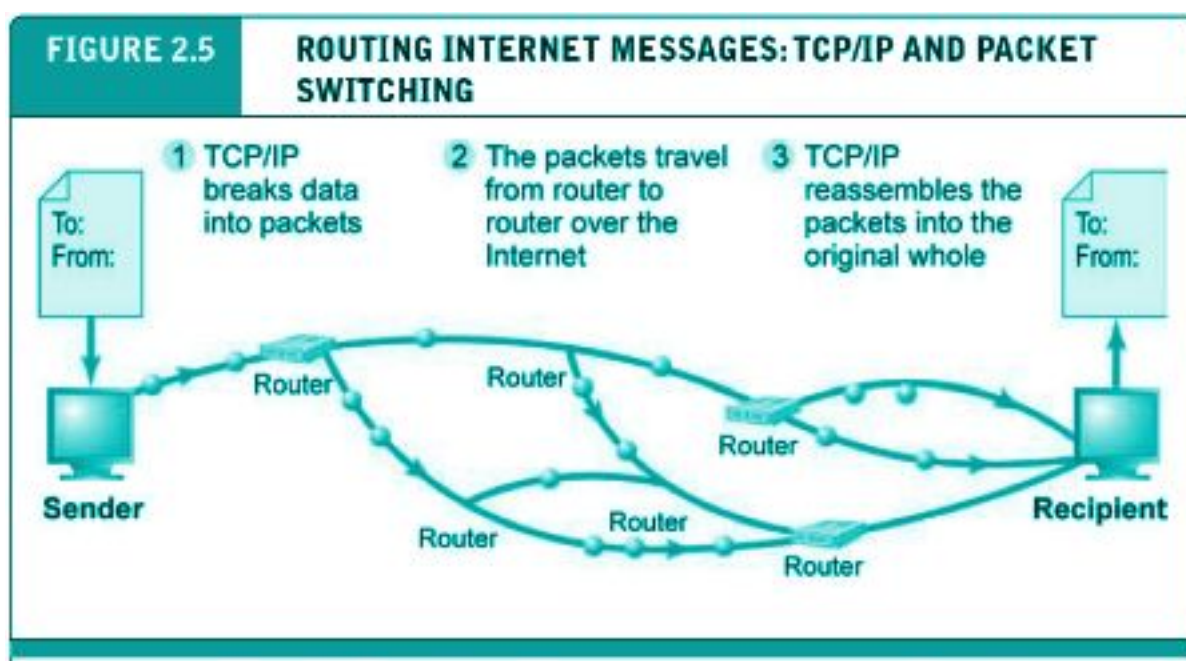
The history of the Internet can be segmented into three phases:

- In the first phase, the Innovation Phase, from 1961 to 1974, the fundamental building blocks of the Internet were conceptualized and then realized in actual hardware and software. The basic building blocks are packet-switching hardware, a communications protocol called TCP/IP, and client/server computing. The original purpose of the Internet, when it was conceived in the 1960s, was to link large mainframe computers on different college campuses. This kind of one-to-one communication between campuses was previously only possible through the telephone system or private networks owned by the large computer manufacturers.
- In the second phase, the Institutionalization Phase, from 1975 to 1995, large institutions such as the U.S. Department of Defense (DoD) and the National Science Foundation (NSF) provided funding and legitimization for the fledgling invention called the Internet. Once the concepts behind the Internet had been proven in several government-supported demonstration projects, the DoD contributed \$1 million to further develop them into a robust military communications system that could withstand nuclear war. This effort created what was then called ARPANET (Advanced Research Projects Agency Network). In 1986, the NSF assumed responsibility for the development of a civilian Internet (then called NSFNET) and began a 10-year-long \$200 million expansion program.
- In the third phase, the Commercialization Phase, from 1995 to the present, government agencies encouraged private corporations to take over and expand both the Internet backbone and local service to ordinary citizens—families and individuals across the world who were not students on campuses. By 2000, the Internet's use had expanded well beyond military installations and research universities.

Packet Switching



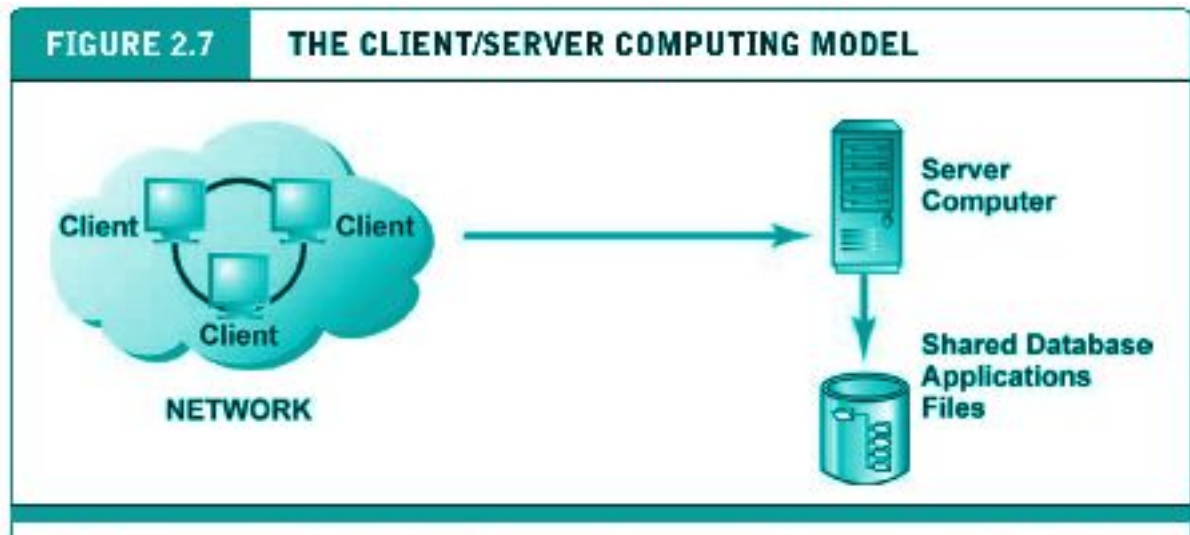
In packet switching, digital messages are divided into fixed-length packets of bits (generally about 1,500 bytes). Header information indicates both the origin and the ultimate destination address of the packet, the size of the message, and the number of packets the receiving node should expect. Because the receipt of each packet is acknowledged by the receiving computer, for a considerable amount of time, the network is not passing information, only acknowledgments, producing a delay called latency.



The Internet uses packet-switched networks and the TCP/IP communications protocol to send, route, and assemble messages. Messages are broken into packets, and packets from the same message can travel along different routes.

- Packet switching is a method of slicing digital messages into discrete units called packets, sending the packets along different communication paths as they become available, and then reassembling the packets once they arrive at their destination.
- In packet-switched networks, messages are first broken down into packets. Appended to each packet are digital codes that indicate a source address (the origination point) and a destination address, as well as sequencing information and error-control information for the packet. Rather than being sent directly to the destination address, in a packet network, the packets travel from computer to computer until they reach their destination. These computers are called routers.
- A router is a special purpose computer that interconnects the different computer networks that make up the Internet and routes packets along to their ultimate destination as they travel. To ensure that packets take the best available path toward their destination, routers use a computer program called a routing algorithm.
- Packet switching does not require a dedicated circuit, but can make use of any spare capacity that is available on any of several hundred circuits. Packet switching makes nearly full use of almost all available communication lines and capacity. Moreover, if some lines are disabled or too busy, the packets can be sent on any available line that eventually leads to the destination point.

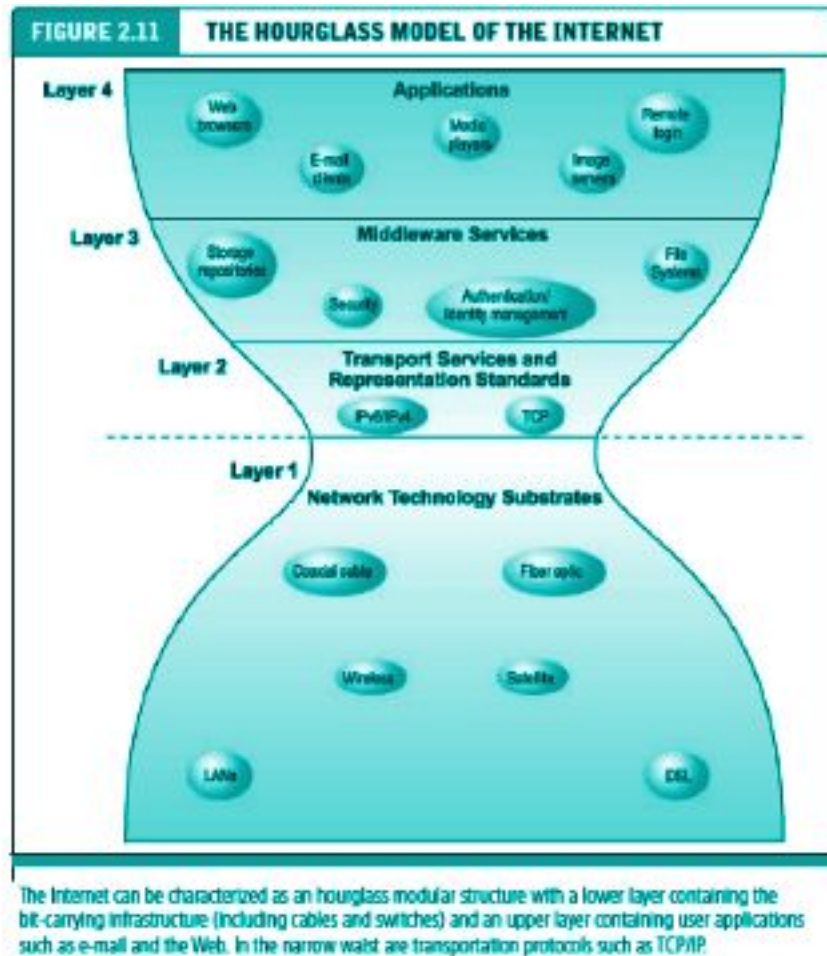
Client / Server Computing



In the client/server model of computing, client computers are connected in a network together with one or more servers.

- Client/server computing is a model of computing in which client computers are connected in a network with one or more servers, which are computers that are dedicated to performing common functions that the client computers on the network need, such as file storage, software applications, printing, and Internet access.
- The client computers are themselves sufficiently powerful to accomplish complex tasks. Servers are networked computers dedicated to common functions that the client computers on the network need, such as file storage, software applications, utility programs that provide Web connections, and printers.
- The Internet is a giant example of client/ server computing in which millions of web servers located around the world can be easily accessed by millions of client computers, also located throughout the world.

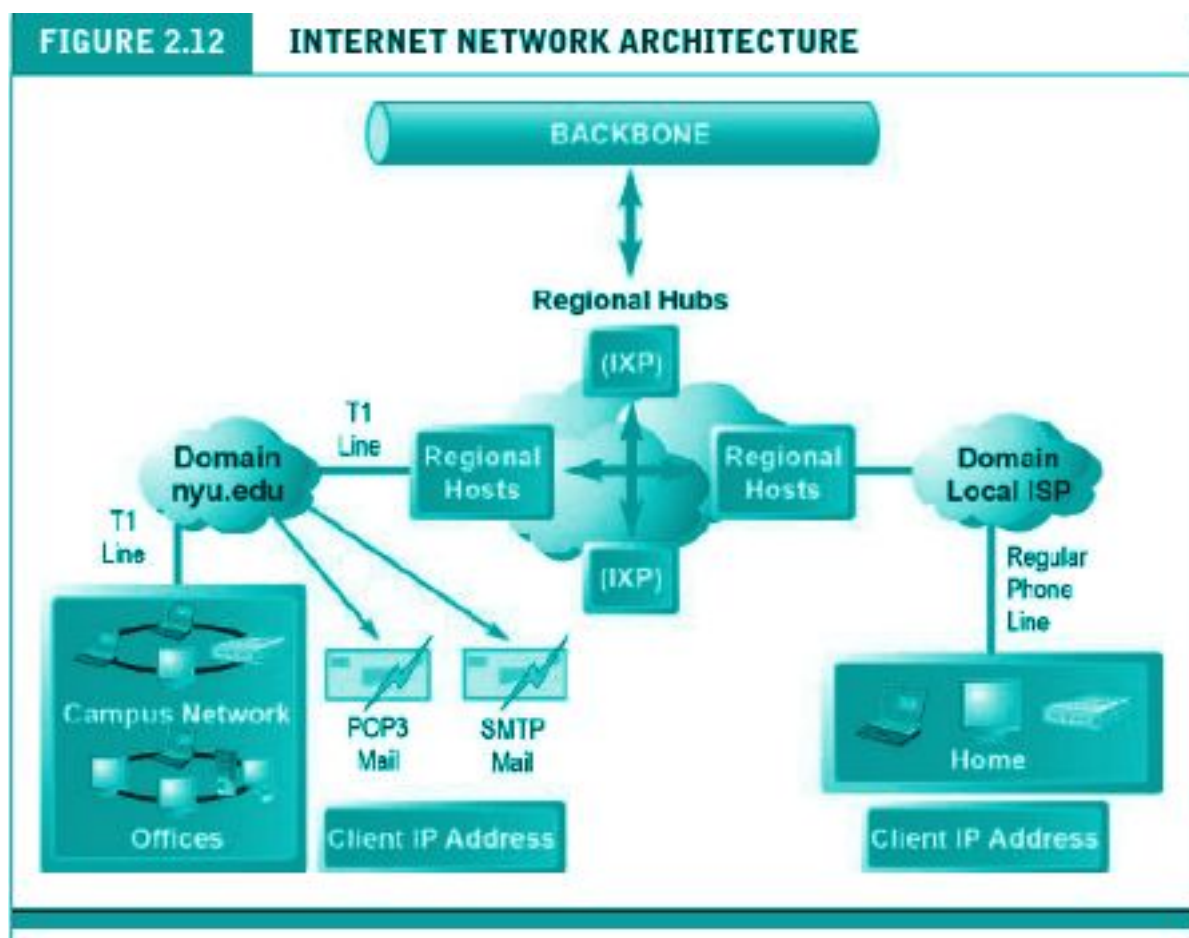
Hourglass Model of the Internet



- Client/server computing is highly extensible. By simply adding servers and clients, the population of Internet users can grow indefinitely.
- The Internet architecture is built in layers so that each layer can change without disturbing developments in other layers.
- The Internet can be viewed conceptually as having four layers:
 - ◆ The Network Technology Substrate layer is composed of telecommunications networks and protocols.
 - ◆ The Transport Services and Representation Standards layer houses the TCP/IP protocol.
 - ◆ The Applications layer contains client applications such as the World Wide Web, email, and audio or video playback.

- ◆ The Middleware Services layer is the glue that ties the applications to the communications networks and includes such services as security, authentication, addresses, and storage repositories. Users work with applications (such as email) and rarely become aware of middleware that operates in the background.
- Because all layers use TCP/IP and other common standards linking all four layers, it is possible for there to be significant changes in the Network layer without forcing changes in the Applications layer.

The Internet Backbone



Today's Internet has a multi-tiered open network architecture featuring multiple backbones, regional hubs, campus area networks, and local client computers.

- Originally, the Internet had a single backbone, but today's Internet is woven together from numerous privately owned networks comprised of high-bandwidth fiber-optic cable that are physically connected with each other and that transfer information from one private network to another.
- These long-haul fiber-optic networks are owned by the major cable providers and firms which are sometimes referred to as Tier 1 Internet Service Providers (Tier 1 ISPs) or the backbone.
- The backbone has been likened to a giant pipeline that transports data around the world in milliseconds. The backbone is typically composed of fiber-optic cable with bandwidths ranging from 155 Mbps to 2.5 Gbps.
- Connections to other continents are made via a combination of undersea fiber optic cable and satellite links. The backbones in foreign countries typically are operated by a mixture of private and public owners.
- The backbone has built-in redundancy so that if one part breaks down, data can be rerouted to another part of the backbone. Redundancy refers to multiple duplicate devices and paths in a network.

Internet Exchange Points

- Hubs where the backbone intersects with regional and local networks, and where the backbone owners connect with one another were originally called Network Access Points (NAPs) or Metropolitan Area Exchanges (MAEs), but now are more commonly referred to as Internet Exchange Points (IXPs).
- IXPs use high-speed switching computers to connect the backbone to regional and local networks, and exchange messages with one another.

- The regional and local networks are owned by private telecommunications firms; they generally are fiber-optic networks operating at more than 100 Mbps.
- The regional networks lease access to ISPs, private companies, and government institutions.

Campus Area Networks

- Campus area networks (CANs) are generally local area networks operating within a single organization—such as New York University or Microsoft Corporation.
- In fact, most large organizations have hundreds of such local area networks. These organizations are sufficiently large that they lease access to the Web directly from regional and national carriers.
- These local area networks generally are running Ethernet (a local area network protocol) and have network operating systems such as Windows Server or Linux that permit desktop clients to connect to the Internet through a local Internet server attached to their campus networks.
- Connection speeds in campus area networks are in the range of 10–100 Mbps to the desktop.

Internet Service Providers

- The firms that provide the lowest level of service in the multi-tiered Internet architecture by leasing Internet access to home owners, small businesses, and some large institutions are called Internet Service Providers (ISPs).
- ISPs are retail providers. They deal with “the last mile of service” to the curb—homes and business offices. ISPs typically connect to IXPs with high-speed telephone or cable lines (45 Mbps and higher).

Digital Subscriber Line (DSL)

- Digital Subscriber Line (DSL) service is a telephone technology that provides high-speed access to the Internet through ordinary telephone lines found in a home or business. Service levels typically range from about .5 to 15 Mbps.
- DSL service requires that customers live within two miles (about 4,000 meters) of a neighborhood telephone switching center.
- In order to compete with cable companies, telephone companies now also offer an advanced form of DSL called FiOS (fiber-optic service) that provides up to 500 Mbps to homes and businesses.

Limitations of the Current Internet

Much of the Internet's current infrastructure is several decades old. It suffers from a number of limitations, including:

- **Bandwidth limitations:** There is insufficient capacity throughout the backbone, the metropolitan switching centers, and most importantly, the "last mile" to the house and small businesses. The result is slow peak-hour service (congestion) and a limited ability to handle high volumes of video and voice traffic.
- **Quality of service limitations:** Today's information packets take a circuitous route to get to their final destinations. This creates the phenomenon of latency—delays in messages caused by the uneven flow of information packets through the network. Today's Internet uses "best-effort" quality of service (QOS), which makes no guarantees about when or whether data will be delivered, and provides each packet with the

same level of service, no matter who the user is or what type of data is contained in the packet.

- **Network architecture limitations:** Today, a thousand requests for a single music track from a central server will result in a thousand efforts by the server to download the music to each requesting client. This slows down network performance, as the same music track is sent out a thousand times to clients that might be located in the same metropolitan area.
- **Wired Internet:** The Internet is still largely based on cables—fiber-optic and coaxial copper cables. Copper cables use a centuries-old technology, and fiber-optic cable is expensive to place underground. The wired nature of the Internet restricts mobility of users although it is changing rapidly as Wi-Fi hotspots proliferate, and cellular phone technology advances. However, cellular systems are often overloaded due to the growth in the number of smartphones.

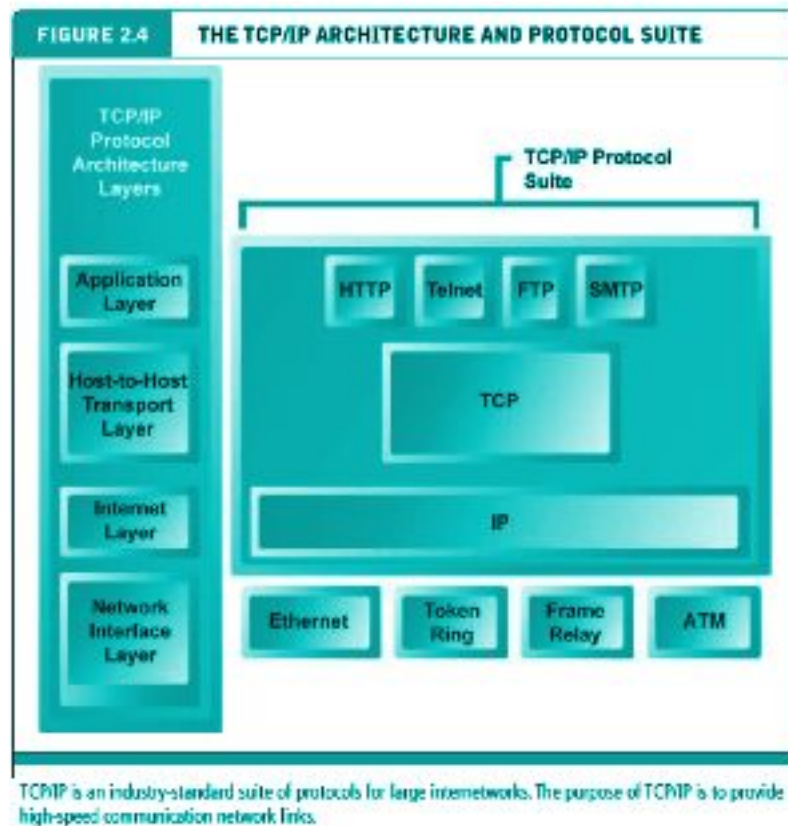
Internet Protocols

HTTP

- HyperText Transfer Protocol (HTTP) is the Internet protocol used to transfer web pages (described in the following section).
- HTTP was developed by the World Wide Web Consortium (W3C) and the Internet Engineering Task Force (IETF).
- HTTP runs in the Application Layer of the TCP/IP model.
- An HTTP session begins when a client's browser requests a resource, such as a web page, from a remote Internet server. When the server responds by sending the page requested, the HTTP session for that object ends.

- Because web pages may have many objects on them—graphics, sound or video files, frames, and so forth—each object must be requested by a separate HTTP message.

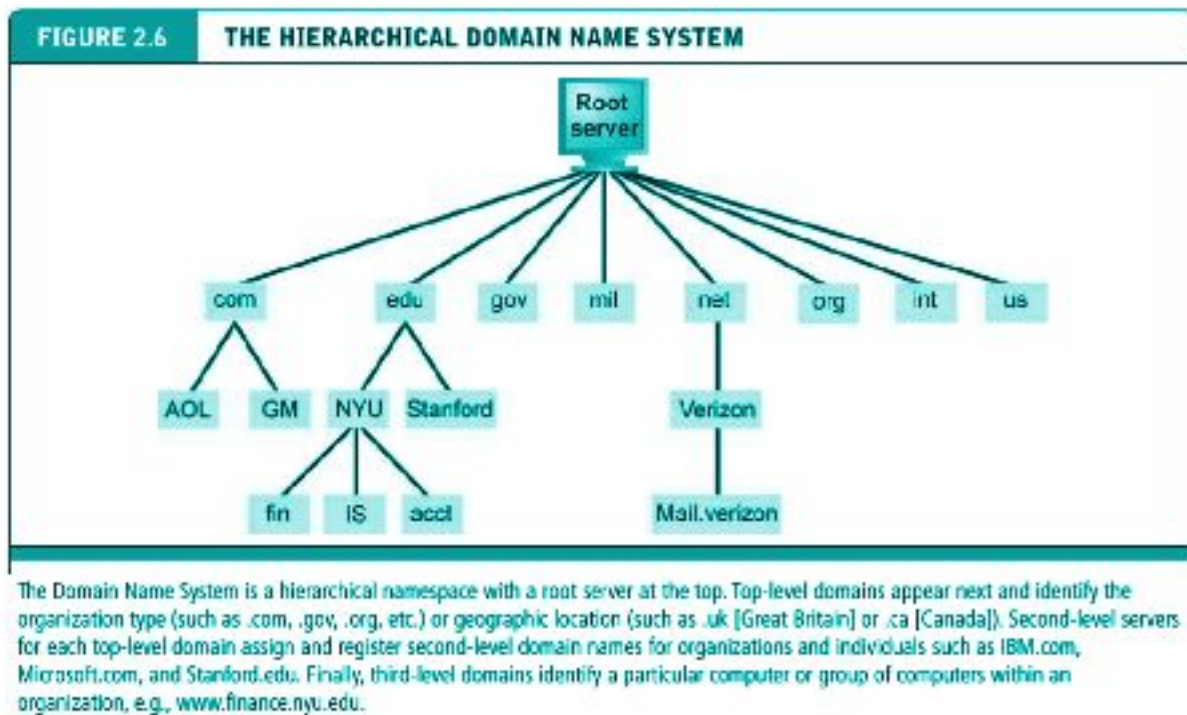
TCP/IP



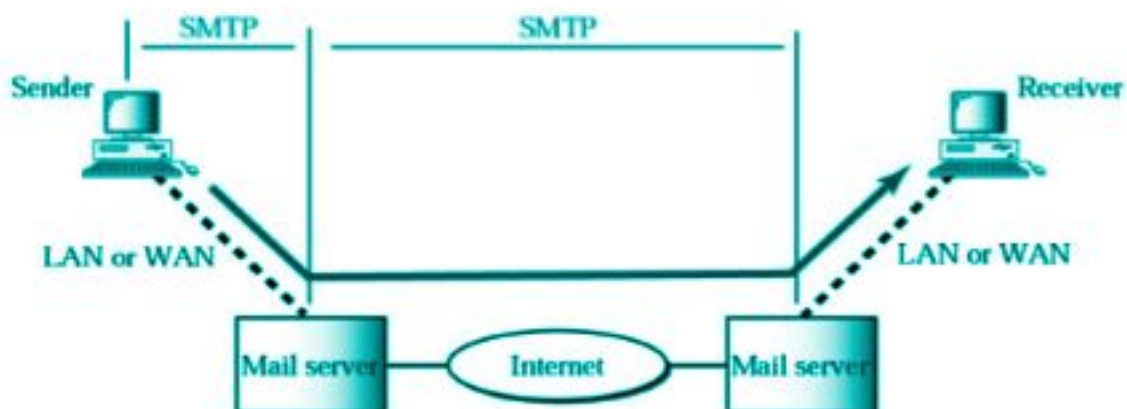
- Transmission Control Protocol/Internet Protocol (TCP/IP) has become the core communications protocol for the Internet.
- TCP establishes the connections among sending and receiving Web computers, and makes sure that packets sent by one computer are received in the same sequence by the other, without any packets missing.
- IP provides the Internet's addressing scheme and is responsible for the actual delivery of the packets.
- TCP/IP is divided into four separate layers, with each layer handling a different aspect of the communication problem:

- ◆ The Network Interface Layer is responsible for placing packets on and receiving them from the network medium, which could be a LAN (Ethernet) or Token Ring network, or other network technology. TCP/IP is independent from any local network technology and can adapt to changes at the local level.
 - ◆ The Internet Layer is responsible for addressing, packaging, and routing messages on the Internet.
 - ◆ The Transport Layer is responsible for providing communication with the application by acknowledging and sequencing the packets to and from the application.
 - ◆ The Application Layer provides a wide variety of applications with the ability to access the services of the lower layers. Some of the best-known applications are HyperText Transfer Protocol (HTTP), File Transfer Protocol (FTP), and Simple Mail Transfer Protocol (SMTP).
- There are two versions of IP currently in use: IPv4 and IPv6:
- ◆ An IPv4 Internet address is expressed as a 32-bit number that appears as a series of four separate numbers marked off by periods, such as 64.49.254.91. It can support up to 2^{32} addresses.
 - ◆ An IPv6 Internet address is 128 bits, so it can support up to 2^{128} addresses, many more than IPv4.
- An IP address can be represented by a natural language convention called a domain name.
- The Domain Name System (DNS) allows expressions such as Cnet.com to stand for a numeric IP address (cnet.com's numeric IP is 216.239.113.101).
- A Uniform Resource Locator (URL), which is the address used by a Web browser to identify the location of content on the Web, also uses a domain name as part of the URL. A typical

URL contains the protocol to be used when accessing the address, followed by its location.



SMTP



- Simple Mail Transfer Protocol (SMTP) is an Internet standard for electronic mail (email) transmission.
- Although electronic mail servers and other mail transfer agents use SMTP to send and receive mail messages,

user-level client mail applications typically use SMTP only for sending messages to a mail server for relaying. For retrieving messages, client applications usually use either IMAP or POP3.

- SMTP communication between mail servers uses TCP port 25. Mail clients on the other hand, often submit the outgoing emails to a mail server on port 587.

POP

- In computing, the Post Office Protocol (POP) is an application-layer Internet standard protocol used by local email clients to retrieve email from a remote server over a TCP/IP connection.
- POP has been developed through several versions, with version 3 (POP3) being the last standard in common use before largely being made obsolete by the more advanced IMAP as well as webmail.
- POP is a much simpler protocol, making implementation easier.
- POP mail moves the message from the email server onto your local computer, although there is usually an option to leave the messages on the email server as well.

IMAP

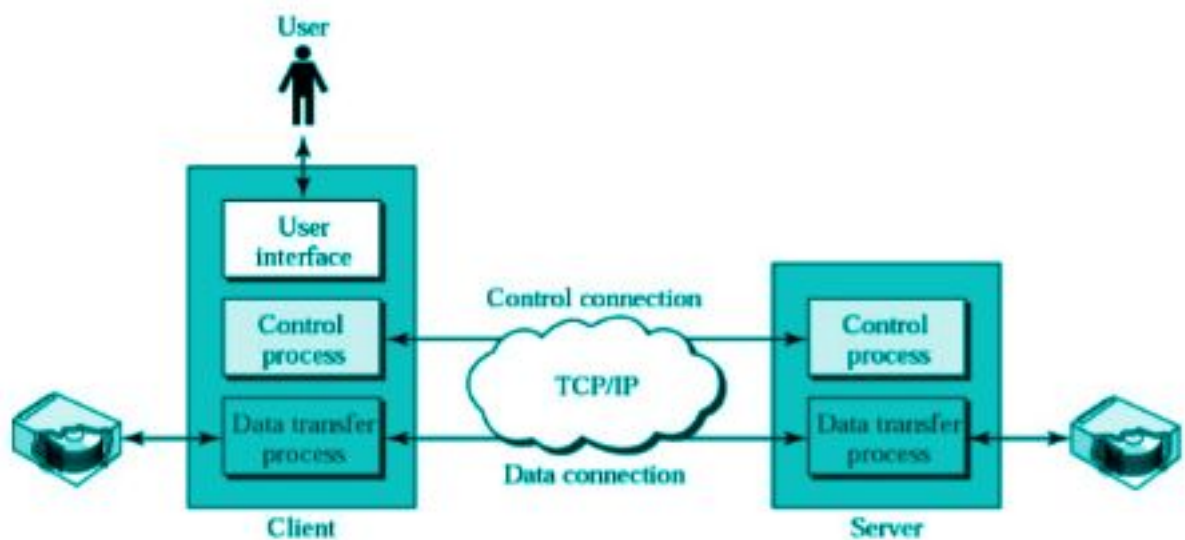
- In computing, the Internet Message Access Protocol (IMAP) is an Internet standard protocol used by email clients to retrieve email messages from a mail server over a TCP/IP connection.
- IMAP was designed with the goal of permitting complete management of an email box by multiple email clients, therefore clients generally leave messages on the server until

the user explicitly deletes them. An IMAP server typically listens on port number 143.

→ Advantages over POP:

- ◆ Connected and disconnected modes of operation
- ◆ Multiple clients simultaneously connected to the same mailbox
- ◆ Access to MIME message parts and partial fetch
- ◆ Message state information
- ◆ Multiple mailboxes on the server
- ◆ Server-side searches
- ◆ Built-in extension mechanism

FTP



- The File Transfer Protocol (FTP) is a standard network protocol used for the transfer of computer files from a server to a client using the client-server model on a computer network.
- FTP uses separate control and data connections between the client and the server. FTP users may authenticate themselves with a clear-text sign-in protocol, normally in the form of a

username and password, but can connect anonymously if the server is configured to allow it.

- For secure transmission that protects the username and password, and encrypts the content, FTP is often secured with SSL/TLS (FTPS). SSH File Transfer Protocol (SFTP) is sometimes also used instead; it is technologically different.

The World Wide Web(WWW)

- The World Wide Web (abbreviated WWW or the Web) is an information space where documents and other web resources are identified by Uniform Resource Locators (URLs), interlinked by hypertext links, and can be accessed via the Internet.
- English scientist Tim Berners-Lee invented the World Wide Web in 1989. He wrote the first web browser computer program in 1990 while employed at CERN in Switzerland. The Web browser was released outside of CERN in 1991, first to other research institutions starting in January 1991 and to the general public on the Internet in August 1991.
- web pages are primarily text documents formatted and annotated with Hypertext Markup Language (HTML). In addition to formatted text, web pages may contain images, video, audio, and software components that are rendered in the user's web browser as coherent pages of multimedia content. Embedded hyperlinks permit users to navigate between web pages.

Hypertext Markup Languages

SGML

- The Standard Generalized Markup Language is a standard for defining generalized markup languages for documents.
- Generalized markup is based on two postulates:
 - ◆ Markup should be declarative: it should describe a document's structure and other attributes, rather than specify the processing to be performed on it. Declarative markup is less likely to conflict with unforeseen future processing needs and techniques.
 - ◆ Markup should be rigorous so that the techniques available for processing rigorously-defined objects like programs and databases can be used for processing documents as well.
- DocBook SGML and LinuxDoc are examples.

HTML

- Hypertext Markup Language (HTML) is the standard markup language for creating web pages and web applications. With Cascading Style Sheets (CSS) and JavaScript it forms a triad of cornerstone technologies for the World Wide Web.
- Web browsers receive HTML documents from a web server or from local storage and render them into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document.
- HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects, such as interactive forms, may be embedded into the rendered page.
- It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. HTML elements are delimited by tags, written using angle brackets.

- Browsers do not display the HTML tags, but use them to interpret the content of the page.
- The World Wide Web Consortium (W3C), maintainer of both the HTML and the CSS standards, has encouraged the use of CSS over explicit presentational HTML since 1997.

DHTML

- Dynamic HTML, or DHTML, is an umbrella term for a collection of technologies used together to create interactive and animated websites by using a combination of a static markup language (such as HTML), a client-side scripting language (such as JavaScript), a presentation definition language (such as CSS), and the Document Object Model (DOM).
- The application of DHTML was introduced by Microsoft with the release of Internet Explorer 4 in 1997.
- DHTML allows scripting languages to change variables in a web page's definition language, which in turn affects the look and function of otherwise "static" HTML page content, after the page has been fully loaded and during the viewing process. Thus the dynamic characteristic of DHTML is the way it functions while a page is viewed, not in its ability to generate a unique page with each page load.

XML

- In computing, Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.
- The design goals of XML emphasize simplicity, generality, and usability across the Internet. It is a textual data format with strong support via Unicode for different human languages.

- Although the design of XML focuses on documents, the language is widely used for the representation of arbitrary data structures such as those used in web services.
- Several schema systems exist to aid in the definition of XML-based languages, while programmers have developed many application programming interfaces (APIs) to aid the processing of XML data.

Web Servers

- web server software refers to the software that enables a computer to deliver web pages written in HTML to client computers on a network that request this service by sending an HTTP request.
- Apache, which works with Linux and Unix operating systems, is the most commonly used type of web server software. Microsoft's Internet Information Services (IIS) also has significant market share.
- Aside from responding to requests for web pages, all web servers provide some additional basic capabilities such as the following:
 - ◆ Security services: These consist mainly of authentication services that verify that the person trying to access the site is authorized to do so. For websites that process payment transactions, the web server also supports SSL and TLS, the protocols for transmitting and receiving information securely over the Internet.
 - ◆ FTP: This protocol allows users to transfer files to and from the server.
 - ◆ Search engine: Search engine modules within the basic web server software package enable indexing of the

site's web pages and content and permit easy keyword searching of the site's content.

- ◆ Data capture: web servers are also helpful at monitoring site traffic, capturing information on who has visited a site, how long the user stayed there, the date and time of each visit, and which specific pages on the server were accessed.
- The term web server is also used to refer to the physical computer that runs web server software. Leading manufacturers of web server computers include Lenovo, Dell, and Hewlett-Packard.
- To be a web server, a computer must have the web server software installed and be connected to the Internet. Every public web server computer has an IP address.

Web Clients

- A Web client, on the other hand, is any computing device attached to the Internet that is capable of making HTTP requests and displaying HTML pages. The most common client is a Windows or Macintosh desktop computer, with various flavors of Unix/Linux computers a distant third.
- However, the fastest growing category of Web clients is not computers at all, but mobile devices. In general, a Web client can be any device—including a printer, refrigerator, stove, home lighting system, or automobile instrument panel—capable of sending and receiving information from a web server.

Web Browsers

- A web browser is a software application for retrieving, presenting and traversing information resources on the World Wide Web.
- An information resource is identified by a Uniform Resource Identifier (URI/URL) that may be a web page, image, video or other piece of content.
- Hyperlinks present in resources enable users easily to navigate their browsers to related resources.
- Although browsers are primarily intended to use the World Wide Web, they can also be used to access information provided by web servers in private networks or files in file systems.
- The most popular web browsers are Google Chrome, Microsoft Edge (preceded by Internet Explorer), Safari, Opera and Firefox.

Intranets and Extranets

Intranets

- An intranet is a TCP/IP network located within a single organization for purposes of communications and information processing.
- Internet technologies are generally far less expensive than proprietary networks, and there is a global source of new applications that can run on intranets.
- In fact, all the applications available on the public Internet can be used in private intranets.

- The largest provider of local area network software is Microsoft, followed by open source Linux, both of which use TCP/ IP networking protocols.

Extranets

- An extranet is a website that allows controlled access to partners, vendors and suppliers or an authorized set of customers – normally to a subset of the information accessible from an organization's intranet. An extranet is similar to a DMZ in that it provides access to needed services for authorised parties, without granting access to an organization's entire network. An extranet is a private network organization.
- Historically the term was occasionally also used in the sense of two organizations sharing their internal networks over a VPN.

Public Networks

- A public network is a type of network wherein anyone, namely the general public, has access and through it can connect to other networks or the Internet.
- This is in contrast to a private network, where restrictions and access rules are established in order to relegate access to a select few. Since a public network has few or no restrictions, users need to be wary of possible security risks when accessing it.
- There is no technical difference between a private and public network in terms of hardware and infrastructure, except for the security, addressing and authentication systems in place.
- Because any user can connect to a public network, its level of security needs to be heightened and various anti-threat and

malicious act precautions must be put in place. Because anyone is able to access the network, malicious users may try to infiltrate the systems of unsuspecting users.

Private Networks

- A private network is any connection within a specified network wherein restrictions are established to promote a secured environment.
- This type of network can be configured in such a way that devices outside the network cannot access it. Only a selected set of devices can access this type of network depending on the settings encoded in the network routers and access points.
- Private networks are most preferred in businesses and private organizations because they provide high security for vital information.
- There are some factors that need to be addressed in order to have a secured connection, making private networks more complicated to set up.

Virtual Private Networks (VPN)

- A virtual private network (VPN) allows remote users to securely access a corporation's local area network via the Internet, using a variety of VPN protocols. VPNs use both authentication and encryption to secure information from unauthorized persons (providing confidentiality and integrity).
- Authentication prevents spoofing and misrepresentation of identities. A remote user can connect to a remote private local network using a local ISP.

- The VPN protocols will establish the link from the client to the corporate network as if the user had dialed into the corporate network directly.
- The process of connecting one protocol through another (IP) is called tunneling, because the VPN creates a private connection by adding an invisible wrapper around a message to hide its content.
- As the message travels through the Internet between the ISP and the corporate network, it is shielded from prying eyes by an encrypted wrapper.
- A VPN is “virtual” in the sense that it appears to users as a dedicated secure line when in fact it is a temporary secure line. The primary use of VPNs is to establish secure communications among business partners—larger suppliers or customers, and employees working remotely.
- A dedicated connection to a business partner can be very expensive. Using the Internet and VPN as the connection method significantly reduces the cost of secure communications.

Internet Connection Options

Connectivity Overview

- ISPs offer several ways to connect to the Internet. The most common connection options are voice-grade telephone line, various types of broadband connections, leased line, and wireless.
- One of the major distinguishing factors between various ISPs and their connection options is the bandwidth they offer. Bandwidth is the amount of data that can travel through a communication line per unit of time.

- The higher the bandwidth, the faster data files travel and the faster web pages appear on your screen. Each connection option offers different bandwidths, and each ISP offers varying bandwidths for each connection option.
- Bandwidth can differ for data traveling to or from the ISP depending on the user's connection type. Symmetric connections provide the same bandwidth in both directions. Asymmetric connections provide different bandwidths for each direction.
- Upstream bandwidth, also called upload bandwidth, is a measure of the amount of information that can travel from the user to the Internet in a given amount of time.
- Downstream bandwidth, also called download or downlink bandwidth, is a measure of the amount of information that can travel from the Internet to a user in a given amount of time (for example, when a user receives a web page from a web server).

Voice-Grade Telephone Connections

- The most common way to connect to an ISP is through a modem connected to your local telephone service provider.
- POTS, or plain old telephone service, uses existing telephone lines and an analog modem to provide a bandwidth of between 28 and 56 Kbps.
- Some telephone companies offer a higher grade of service called Digital Subscriber Line (DSL) protocol. DSL connection methods do not use a modem. They use a piece of networking equipment that is similar to a network switch, but most people call this piece of equipment (incorrectly) a "DSL modem".

- Integrated Services Digital Network (ISDN) was the first technology developed to use the DSL protocol suite and has been available in parts of the United States since 1984. ISDN is more expensive than regular telephone service and offers bandwidths of between 128 Kbps and 256 Kbps.

Broadband Connections

- Connections that operate at speeds of greater than about 200 Kbps are called broadband services.
- One of the technologies that uses the DSL protocol to provide service in the broadband range is asymmetric digital subscriber line (ADSL, usually abbreviated DSL). It provides transmission bandwidths from 100 to 640 Kbps upstream and from 1.5 to 9 Mbps downstream.
- For businesses, a high-speed DSL (HDSL) connection service can provide more than 768 Kbps of symmetric bandwidth. Cable modems—connected to the same broadband coaxial cable that serves a television—typically provide transmission speeds between 300 Kbps and 1 Mbps from the client to the server. The downstream transmission rate can be as high as 10 Mbps.
- Unlike DSL, cable modem connection bandwidths vary with the number of other subscribers competing for the shared resource. Transmission speeds can decrease dramatically in heavily subscribed neighborhoods at prime times—in neighborhoods where many people are using cable modems simultaneously.

Leased-Line Connections

- Large firms with large amounts of Internet traffic can connect to an ISP using higher bandwidth connections that they can lease from telecommunications carriers.
- These connections use a variety of technologies and are usually classified by the equivalent number of telephone lines they include.
- A telephone line designed to carry one digital signal is called DS0 (digital signal zero, the name of the signaling format used on those lines) and has a bandwidth of 56 Kbps. A T1 line (also called a DS1) carries 24 DS0 lines and operates at 1.544 Mbps.
- Some telecommunications companies offer fractional T1, which provides service speeds of 128 Kbps and upward in 128-Kbps increments. T3 service (also called DS3) offers 44.736 Mbps (the equivalent of 30 T1 lines or 768 DS0 lines).
- All of these leased telephone line connections are much more expensive than POTS, ISDN, or DSL connections. Large organizations that need to connect hundreds or thousands of individual users to the Internet require very high bandwidth.
- An OC3 (optical carrier 3) connection provides 156 Mbps, an OC12 provides 622 Mbps, an OC48 provides 2.5 Gbps, and an OC192 provides 10 Gbps.

Wireless Connections

- In the first satellite technologies, the customer placed a receiving dish antenna on the roof or in the yard and pointed it at the satellite.
- The satellite sent microwave transmissions to handle Internet downloads at speeds of around 500 Kbps. Uploads were handled by a POTS modem connection.
- In recent years, have begun offering satellite Internet connections that do not require a POTS modem connection for

uploads. These connections use a microwave transmitter for Internet uploads. This transmitter provides upload speeds as high as 150 Kbps.

- The most common wireless connection technology for use on LANs is called Wi-Fi, wireless Ethernet, or 802.11b.
- A computer equipped with a Wi-Fi network card can communicate through a wireless access point connected to a LAN to become a part of that LAN.
- A wireless access point (WAP) is a device that transmits network packets between Wi-Fi-equipped computers and other devices that are within its range. Wi-Fi has a potential bandwidth of 11Mbps and a range of about 300 feet.
- Today, companies that sell mobile telephone services also sell Internet access through their cellular networks.



Chapter 3. Selling on the Web: Revenue Models and Consumer Behavior

Revenue Models

A firm's revenue model describes how the firm will earn revenue, generate profits, and produce a superior return on invested capital.

Web Catalog Revenue Models

- Many companies sell goods and services on the Web using an adaptation of a mail order catalog revenue model that is more than 100 years old.
- This revenue model, which is often called the mail order or catalog model, has proven to be successful for a wide variety of consumer items, including apparel, computers, electronics, housewares, and gifts.
- Companies can take this catalog model online by replacing or supplementing their print catalogs with information on their websites. When the catalog model is expanded this way, it is often called the web catalog revenue model.
- Customers can place orders through the website or by telephone. This flexibility is important because many consumers are still reluctant to buy on the Web.
- In the first few years of consumer electronic commerce, most shoppers used the Web to obtain information about products and compare prices and features, but then made their purchases by telephone.
- Many of the most successful Web catalog sales businesses are firms that were already operating in the mail order business and simply expanded their operations to the Web.

- Other companies that use the Web catalog revenue model adopted it after realizing that the products they sold in their physical stores could also be sold on the Web. This additional sales outlet did not require them to build additional stores, yet provided access to customers throughout the world.
- Types of businesses using the Web catalog revenue model include sellers of computers and consumer electronics; books, music, and videos; luxury goods; clothing; flowers and gifts; and general discount merchandise.

Digital Content Revenue Models

- Online businesses that use the digital content model either own or have the rights to this digital content, whether it is words, numbers, pictures or videos.
- Generally they offer some sort of subscription that allows a customer to access the content along with additional services such as full-text searching of various types of information.
- Digital copies of published newspapers, journals and magazines are sold or subscribed to and are sent to customers in various ways. The daily newspaper may be sent directly to a subscriber's email address.
- An additional service may be applied where only topics that the subscriber is interested in are received.
- Legal, financial, corporate or government information may be periodically downloaded or mailed on a compact disc to subscribing businesses that need to update their records for their own reference and research.
- This revenue model allows companies to save time and money because digital information does not need to be printed or delivered.

Advertising Supported Revenue Models

- This revenue model generally offers free information or entertainment along with advertising messages which has been most apparent in television, radio and newspapers. Through the generation of revenue from advertising, such organizations are able to continue their existence.
- One major problem with advertising on the internet is the fact that there are no specific measurements for charging for the service.
- Another problem is that not many websites have a wide enough viewer base that would encourage advertisers to place advertisements. The website would have to collect demographic information from visitors in order to prove this. Visitors of websites are not always willing to provide such information due to concerns about their privacy.
- Web portals, Web directories and search engines make use of this model by taking advantage of the information they receive from visitors.
- Because visitors use these types of sites as a means of accessing other resources on the internet, information on what they are interested in is captured and advertisements of a similar nature can be displayed alongside the resources they are accessing.
- Newspapers have expanded into an online existence where they either offer all of their printed content on their website or just parts of it. There are concerns that the online version may reduce sales of the printed newspaper but the fact is, the advertising reaches a larger audience and there is greater exposure of the newspaper's name.

Advertising Subscription Mixed Revenue Models

- Magazines publishers have been making the most use of this revenue model for many years now. They generate revenue through a paid subscription service that periodically delivers magazines to viewers and through some advertising. This model uses a lot less advertising than the advertising-supported revenue model.
- With the concerns of the online newspapers reducing the sales of printed newspapers, some newspaper publishers have found that adopting this model on their websites can help in making more use of their online resources, earning more revenue.
- They would generally offer some parts of the newspaper for free while other parts and features are only available to subscribed customers.
- For example, a non-paying viewer may be able to read today's news but cannot access articles prior to today. A subscriber can make use of all the content and may be able to use a search feature that would allow them to find archived articles of interest.
- It is common for magazines and newspapers to use different revenue models for their websites and their printed content. This helps maximise the generation of revenue for these companies.

Fee-for-Transaction Revenue Models

- Businesses that use this revenue model offer services which they charge for based on the size of the transaction.
- This model has shown much success on the internet through travel agents, vehicle sales, ticket sales, financial services and others.

- By providing these services online, companies are able to remove the human agent as the intermediary (known as disintermediation) and introduce a website as the new intermediary (known as reintermediation).
- Fee-for-transaction revenue models generally generate revenue through the earning of commissions. The larger the transactions, the more they earn.
- Using this model on the internet offers some flexibility that businesses can take advantage of such as lower overhead costs and the ability to earn some extra revenue through some level of advertising.

Online Consumer Behavior

Internet Traffic Patterns: Online Consumer Profile

→ **Intensity and Scope of Usage**

- ◆ The slowing rate of growth in the Internet population is compensated for, in part, by an increasing intensity and scope of use.

→ **Demographics and Access**

- ◆ In recent years, there has been a marked increase in Internet usage by females, minorities, seniors, and families with modest incomes, resulting in a notable decrease—but not elimination—in the earlier inequality of access and usage. Gender, income, education, age, and ethnicity also impact online behavior.

→ **Type of Internet Connection**

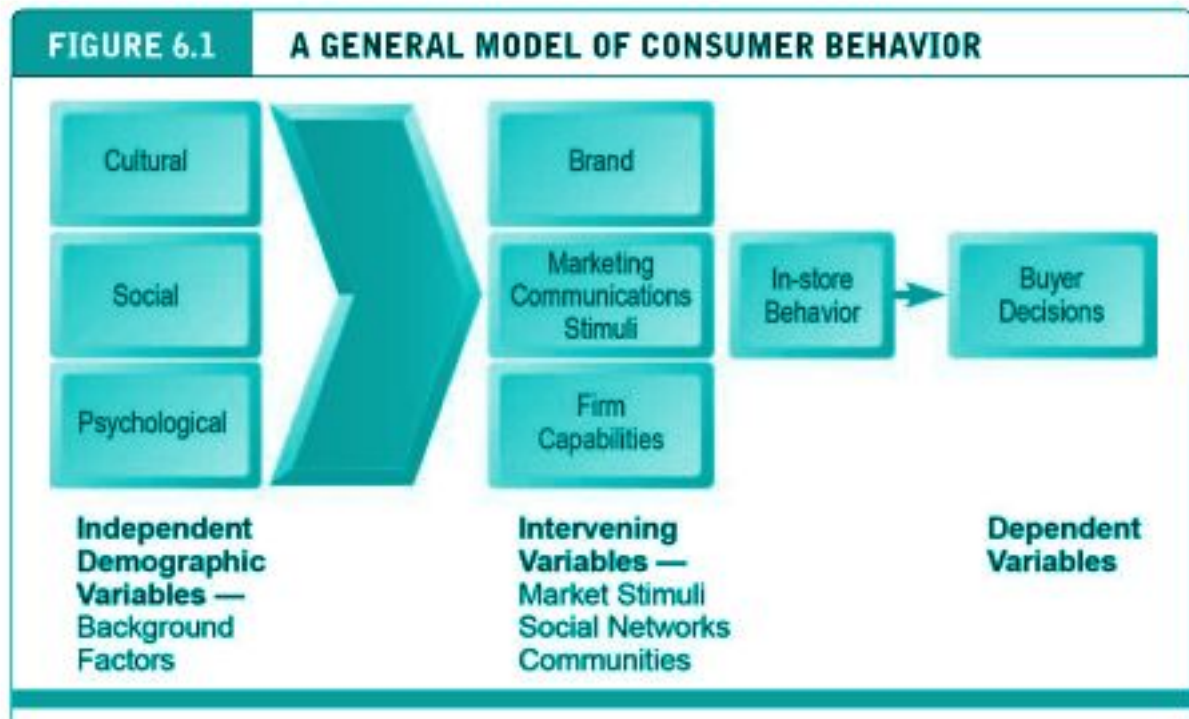
- ◆ While a great deal of progress has been made in reducing glaring gaps in access to the Internet, there are still inequalities in access to broadband service.

→ **Community Effects**

- ◆ Social networks have a powerful influence on shopping and purchasing behavior. Membership in social networks has a large influence on discovering new independent music, but less influence on already well-known products.

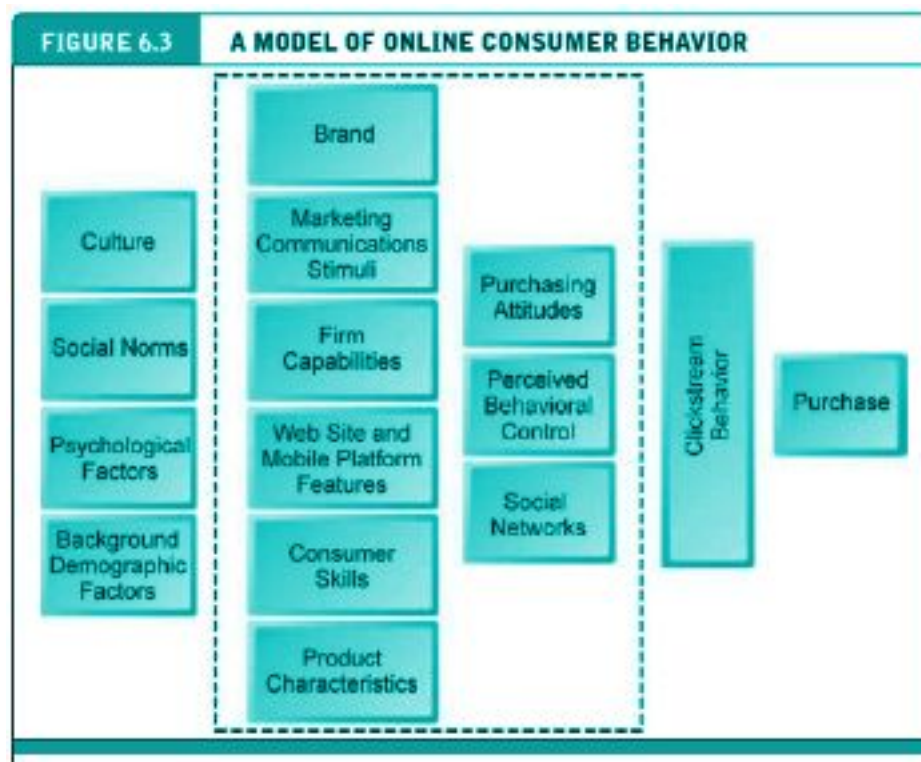
Consumer Behavior Models

- Once firms have an understanding of who is online, they need to focus on how consumers behave online. The study of consumer behavior is a social science discipline that attempts to model and understand the behavior of humans in a marketplace.
- Several social science disciplines play roles in this study, including sociology, psychology, and economics.
- Models of consumer behavior attempt to predict or “explain” what consumers purchase and where, when, how much, and why they buy.
- The expectation is that if the consumer decision-making process can be understood, firms will have a much better idea how to market and sell their products.



Consumer behavior models try to predict the decisions that consumers make in the marketplace.

Psychographic Profiles of Online Consumers



In this general model of online consumer behavior, the decision to purchase is shaped by background demographic factors, several intervening factors, and, finally, influenced greatly by clickstream behavior very near to the precise moment of purchase.



- Online consumer behavior parallels that of offline consumer behavior with some obvious differences. It is important to first understand why people choose the Internet channel to conduct transactions. While price is an important consideration, consumers also shop online because of convenience, which in turn is produced largely by saving them time. Overall transaction cost reduction appears to be a major motivator for choosing the online channel.
- Among the most important reasons for purchasing online are price and the availability of free shipping. That the seller is someone whom the purchaser trusts is also a very important factor. The ability to make a purchase without paying tax and the availability of an online coupon are also significant factors.
- There are five stages in the consumer decision process:
 - ◆ awareness of need
 - ◆ search for more information

- ◆ evaluation of alternatives
 - ◆ the actual purchase decision
 - ◆ post-purchase contact with the firm.
- In the online model, website and mobile platform features, along with consumer skills, product characteristics, attitudes towards online purchasing, and perceptions about control over the online environment come to the fore.
 - website and mobile platform features include latency (delay in downloads), navigability, and confidence in online security.
 - Consumer skills refers to the knowledge that consumers have about how to conduct online transactions.
 - Product characteristics refers to the fact that some products can be easily described, packaged, and shipped online, whereas others cannot.
 - Combined with traditional factors, such as brand, advertising, and firm capabilities, these factors lead to specific attitudes about purchasing from an e-commerce firm and a sense that the consumer can control his or her environment online.
 - Clickstream behavior refers to the transaction log that consumers establish as they move about the Web, from search engine to a variety of sites, then to a single site, then to a single page, and then, finally, to a decision to purchase.

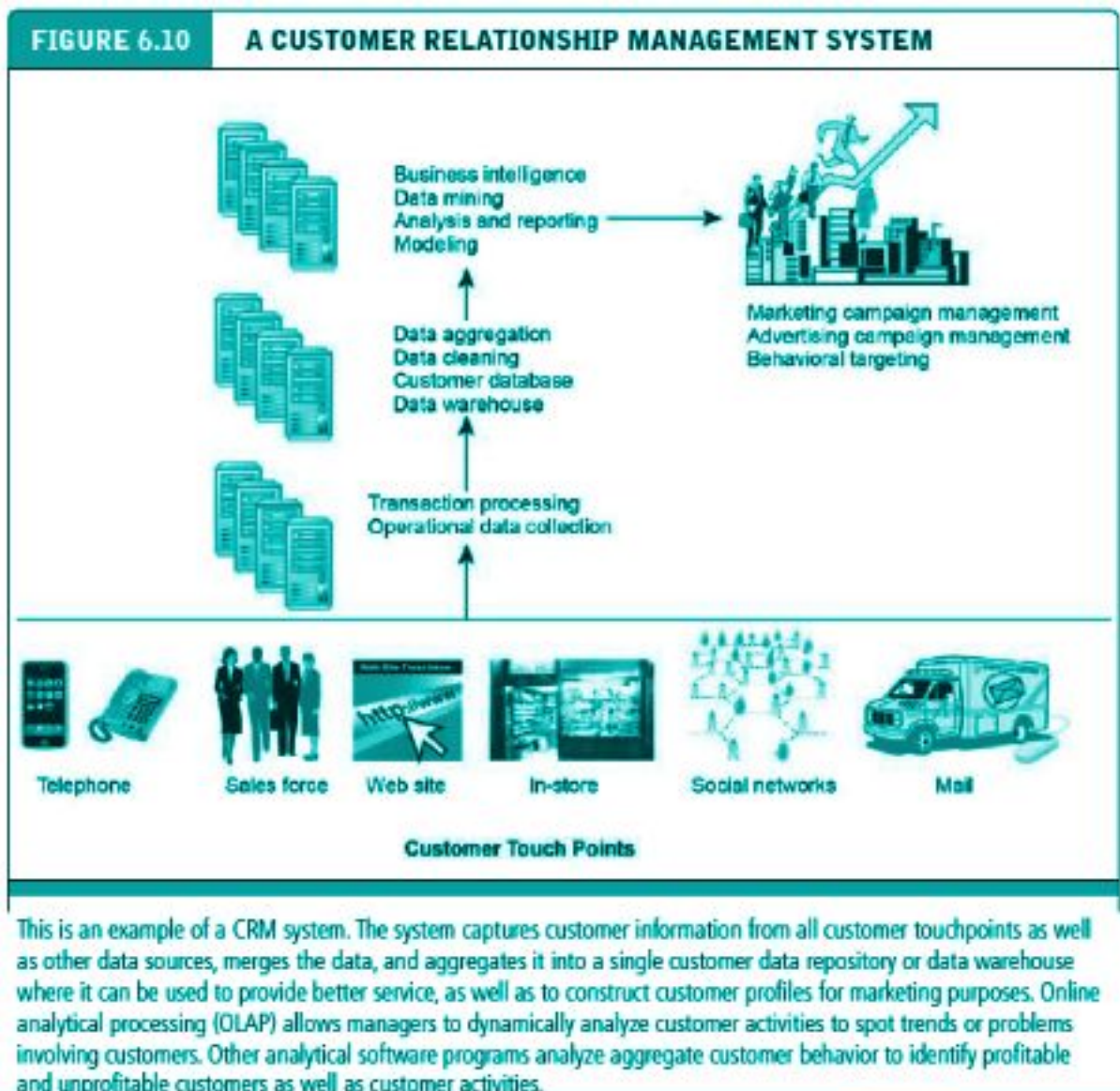
Shoppers: Browsers and Buyers

- Although the Internet audience still tends to be concentrated among the well educated, affluent, and youthful, the audience is increasingly becoming more diverse.
- Beneath the surface of the €1.96 trillion B2C e-commerce market in 2015 are substantial differences in how users shop online.

- Worldwide, about 1.4 billion people (about 45% of the Internet population) are “buyers” who actually purchase something online.
- In the United Kingdom, 88.2% of Internet users, age 14 and older, are buyers, while another 5.3% research products online (“browsers”), but purchase them offline.
- With the teen and adult U.K. Internet audience (14 years or older) estimated at about 47 million in 2015, online shoppers (the combination of buyers and browsers, totalling almost 93.5%) add up to a market size of almost 44 million consumers.
- E-commerce is a major conduit and generator of offline commerce. The reverse is also true: online traffic is driven by offline brands and shopping. While online research influences offline purchases, it is also the case that offline marketing media heavily influence online behavior including sales.

Customer Retention

Customer Relationship Management (CRM)



- A customer relationship management (CRM) system is a repository of customer information that records all of the contacts that a customer has with a firm (including websites) and generates a customer profile available to everyone in the firm with a need to “know the customer.”
- CRM systems also supply the analytical software required to analyze and use customer information.
- Customers come to firms not just over the Web but also through telephone call centers, customer service representatives, sales representatives, automated voice

response systems, ATMs and kiosks, in-store point-of-sale terminals, and mobile devices (m-commerce). Collectively, these are referred to as “customer touchpoints”.

- CRMs are essentially a database technology with extraordinary capabilities for addressing the needs of each customer and differentiating the product or service on the basis of treating each customer as a unique person.
- Customer profiles can contain the following information:
 - ◆ A map of the customer’s relationship with the institution
 - ◆ Product and usage summary data
 - ◆ Demographic and psychographic data
 - ◆ Profitability measures
 - ◆ Contact history summarizing the customer’s contacts with the institution across most delivery channels
 - ◆ Marketing and sales information containing programs received by the customer and the customer’s responses
 - ◆ Email campaign responses
 - ◆ website visits
 - ◆ Mobile app downloads
- With these profiles, CRMs can be used to sell additional products and services, develop new products, increase product utilization, reduce marketing costs, identify and retain profitable customers, optimize service delivery costs, retain high lifetime value customers, enable personal communications, improve customer loyalty, and increase product profitability.
- The goal is what is known as a “360-degree” view that enables a company to know what its customers buy, how they browse, what kinds of communications and offers will engage them, and more.

- Leading CRM vendors include Oracle, SAP, Microsoft, Salesforce.com, and SugarCRM, many of which offer cloud-based versions of their CRM products.



Chapter 4. Marketing on the Web

Web Marketing Strategies

- The objective of online marketing—as in all marketing—is to build customer relationships so that the firm can achieve above-average returns (both by offering superior products or services and by communicating the brand's features to the consumer). These relationships are a foundation for the firm's brand.
- Compared to traditional print and television marketing, online marketing can be more personalized, participatory, peer-to-peer, and communal.

Product-based Marketing Strategies

- Product-based marketing strategies focus on a company's product offering rather than any particular customer.
- Companies like Staples and Sears, for instance, primarily use a mass marketing strategy that assumes large numbers of customers are looking for specific products or product categories.
- The company's primary goal in the marketing mix is to make it widely known that it carries these product categories and make it easy for customers to locate and purchase them.
- The focus of product-based strategies is the SWOT analysis. Based on this analysis of the company's competitive strengths and weaknesses and the opportunities and threats presented by competitors, a company must either create products so distinctive that customers can't get them elsewhere, or it must position products with universal demand more favorably than its competitors do.

Customer-based Marketing Strategies

- Customer-based strategies begin by identifying the company's target customers. Market research finds the customers most likely to purchase the company's existing or planned products, then builds a profile describing how to reach and engage those customers.
- The company's marketing mix, including the features of the product itself, are tailored toward the customer segments chosen.
- These segments may be broad or as narrow as one individual customer. This strategy views customers as assets that provide returns over time on the marketing investment required to attract them.
- Initially, the market of potential customers is divided into various segments based on criteria that are meaningful to the company's brand.
- Demographics such as income, age, gender and occupation are some of the most widely used market segmentation qualities.
- The company then chooses one or more specific segments to target and crafts the "four P's" of the marketing mix - product, price, promotion and place - to position its product offerings favorably in the target customers' perception.

Types of Marketing

TYPE OF MARKETING	PLATFORMS	EXAMPLES	FUNCTION
Web Site	Traditional Web site	Ford.com	Anchor site
	Search engine marketing	Google; Bing; Yahoo	Query-based intention marketing
	Display advertising	Yahoo; Google; MSN	Interest- and context-based marketing; targeted marketing
Traditional Online Marketing	E-mail	Major retailers	Permission marketing
	Affiliates	Amazon	Brand extension
	Social networks	Facebook	Conversations; sharing
	Micro blogging sites	Twitter	News, quick updates
	Blogs/forums	Tumblr	Communities of interest; sharing
Social Marketing	Visual marketing	Pinterest/Instagram	Branding; sharing
	Video marketing	YouTube	Engage; inform
	Game marketing	Chipotle Scarecrow Game	Identification
Mobile Marketing	Mobile site	m.ford.com	Quick access; news; updates
	Apps	2015 Ford Mustang Customizer	Visual engagement
		My Ford	Visual engagement
Offline Marketing	Television	2015 Ford F-150: This Changes Everything	Brand anchoring; inform
	Newspapers	Apple Shot on iPhone 6 campaign	Brand anchoring; inform
	Magazines	Apple Watch/Vogue Magazine	Brand anchoring; inform

Permission Marketing

- Many businesses are finding that they can maintain an effective dialog with their customers by using automated email communications.

- Sending one email message to a customer can cost less than 1 cent if the company already has the customer's email address.
- Purchasing the email addresses of people who ask to receive specific kinds of email messages adds between a few cents and a dollar to the cost of each message sent.
- Another factor to consider is the conversion rate. The conversion rate of an advertising method is the percentage of recipients who respond to an ad or promotion. Conversion rates on requested email messages range from 10 percent to more than 30 percent. These are much higher than the click-through rates on banner ads, which are currently under .5 percent and decreasing.
- The practice of sending email messages to people who request information on a particular topic or about a specific product is called opt-in email and is part of a marketing strategy called permission marketing.
- A marketing strategy that sends specific information only to people who have indicated an interest in receiving information about the product or service being promoted should be more successful.

Affiliate Marketing

- Affiliate marketing is a form of marketing where a firm pays a commission, typically anywhere between 4% to 20%, to other websites (including blogs) for sending customers to their website.
- Affiliate marketing generally involves pay-for-performance: the affiliate or affiliate network gets paid only if users click on a link or purchase a product.
- Industry experts estimate that around 10% of all retail online sales are generated through affiliate programs.

- Visitors to an affiliate website typically click on ads and are taken to the advertiser's website. In return, the advertiser pays the affiliate a fee, either on a per-click basis or as a percentage of whatever the customer spends on the advertiser's site.
- For instance, Amazon has a strong affiliate program consisting of more than 1 million participant sites, called Associates, which receive up to 10% in advertising fees on sales their referrals generate. Affiliates attract people to their blogs or websites where they can click on ads for products at Amazon.
- Members of eBay's Affiliates Program can earn between 50% and 75% of eBay's revenue on winning bids and Buy It Now transactions as well as between \$20 and \$35 for each active registered user sent to eBay.
- Bloggers often sign up for Google's AdSense program to attract advertisers to their sites. They are paid for each click on an ad and sometimes for subsequent purchases made by visitors.

Viral Marketing

- Viral marketing is a form of social marketing that involves getting customers to pass along a company's marketing message to friends, family, and colleagues.
- It's the online version of word-of-mouth advertising, which spreads even faster and further than in the real world.
- In addition to increasing the size of a company's customer base, customer referrals also have other advantages: they are less expensive to acquire because existing customers do all the acquisition work, and they tend to use online support services less, preferring to turn back to the person who referred them for advice.

- Also, because they cost so little to acquire and keep, referred customers begin to generate profits for a company much earlier than customers acquired through other marketing methods.
- There are a number of online venues where viral marketing appears. Email used to be the primary online venue for viral marketing (“please forward this email to your friends”), but venues such as Facebook, Pinterest, Instagram, Twitter, YouTube, and blogs now play a major role.

Lead Generating Marketing

- Lead generation marketing uses multiple e-commerce presences to generate leads for businesses who later can be contacted and converted into customers through sales calls, email, or other means.
- In one sense, all Internet marketing campaigns attempt to develop leads. But lead generation marketing is a specialized subset of the Internet marketing industry that provides consulting services and software tools to collect and manage leads for firms, and to convert these leads to customers.
- Sometimes called “inbound marketing,” lead generation marketing firms help other firms build websites, launch email campaigns, use social network sites and blogs to optimize the generation of leads, and then manage those leads by initiating further contacts, tracking interactions, and interfacing with customer relationship management systems to keep track of customer-firm interactions.
- One of the foremost lead generation marketing firms is Hubspot, which has developed a software suite for generating and managing leads.

Pricing Strategies

- Pricing (putting a value on goods and services) is an integral part of marketing strategy. Together, price and quality determine customer value.
- Ideally, in order to maximize sales and profits, a firm would like to pick up all the money in the market by selling the product at the price each customer is willing to pay. This is called **price discrimination**—selling products to different people and groups based on their willingness to pay. If some people really want the product, sell it to them at a high price. But sell it to indifferent people at a much lower price; otherwise, they will not buy. This only works if the firm can (a) identify the price each individual would be willing to pay, and (b) segregate the customers from one another so they cannot find out what the others are paying.
- Everyone likes a bargain, and the best bargain is something for **free**. Businesses give away free PCs, free data storage, free music, free websites, free photo storage, and free Internet connections. The **freemium** pricing model is a cross-subsidy online marketing strategy where users are offered a basic service for free, but must pay for premium or add-on services.
- One solution to the problem of free information goods is **versioning**—creating multiple versions of the goods and selling essentially the same product to different market segments at different price.
- **Bundling** offers consumers two or more goods for a price that is less than the goods would cost when purchased individually. The key idea behind the concept of bundling is that although consumers typically.
- With **dynamic pricing**, the price of the product varies, depending on the demand characteristics of the customer and the supply situation of the seller.

- **Flash marketing** has proved extraordinarily effective for travel services, luxury clothing goods, and other goods. Using email or dedicated website features to notify loyal customers (repeat purchasers), merchants offer goods and services for a limited time (usually hours) at very low prices.

Online Marketing Tools

Search Engine Marketing and Advertising

- Search engine marketing (SEM) refers to the use of search engines to build and sustain brands.
- Most search engines offer **paid inclusion** programs, which, for a fee, guarantee a website's inclusion in its list of search results, more frequent visits by its Web crawler, and suggestions for improving the results of organic searching.
- **Pay-per-click (PPC) search ads** are the primary type of search engine advertising.
- In **keyword advertising**, merchants purchase keywords through a bidding process at search sites, and whenever a consumer searches for that word, their advertisement shows up somewhere on the page, usually as a small text-based advertising on the right, but also as a listing on the very top of the page.
- **Network keyword advertising (context advertising)**, introduced by Google as its AdSense product in 2002, allows publishers (websites that want to show ads) to join these networks and allow the search engine to place "relevant" ads on their sites.
- **Search engine optimization (SEO)** is the process of improving the ranking of web pages with search engines by altering the content and design of the web pages and site. By carefully

selecting keywords used on the web pages, updating content frequently, and designing the site so it can be easily read by search engine programs, marketers can improve the impact and return on investment in their Web marketing programs.

→ **Social search** is an attempt to use your social contacts (and your entire social graph) to provide search results. In contrast to search engines that use a mathematical algorithm to find pages that satisfy your query, social search reviews your friends' (and their friends') recommendations, past Web visits, and use of Like buttons.

→ Search Engine Issues

- ◆ **Link farms** are groups of websites that link to one another, thereby boosting their ranking in search engines that use a PageRank algorithm to judge the "usefulness" of a site.
- ◆ **Content farms** are companies that generate large volumes of textual content for multiple websites designed to attract viewers and search engines.
- ◆ **Click fraud** occurs when a competitor clicks on search engine results and ads, forcing the advertiser to pay for the click even though the click is not legitimate.

Display Ads

- A **banner ad** displays a promotional message in a rectangular box on the screen of a desktop computer or mobile device.
- Ads that employ animation, sound, and interactivity, using Flash, HTML5, Java, and JavaScript are referred to as **rich media ads**.
- An **interstitial ad** is a way of placing a full-page message between the current and destination pages of a user.

- **Online video ads** are TV-like advertisements that appear as in-page video commercials or before, during, or after a variety of content.
- A **sponsorship** is a paid effort to tie an advertiser's name to particular information, an event, or a venue in a way that reinforces its brand in a positive yet not overtly commercial manner.
- Advertising that looks similar to editorial content is known as **native advertising**.
- **Content marketing** creates a content campaign for a brand and then tries to secure placement on a variety of website.
- Specialized marketing firms called **advertising networks** appeared to help firms take advantage of the powerful marketing potential of the Internet, and to make the entire process of buying and selling online ads more efficient and transparent.
- An **ad exchange** is a digital marketplace that uses an automated auction-based method known as **programmatic advertising** to match supply and demand of online display advertising. Programmatic advertising uses a **real-time bidding (RTB)** process to match advertiser demand for display ads with publisher supply of web page space.
- Issues
 - ◆ **Ad fraud:** There are four primary sources of ad fraud. Botnets can be hired by publishers to click on their web pages to create phony traffic. Second, a browser extension can insert ads into a premium publisher's website, and then list the ads as available on a programmatic ad exchange. Third, ad targeting firms can create bots that imitate the behavior of real shoppers, and then charge advertisers for successfully targeting consumers. Fourth, if you are a publisher looking to

attract ads to your site, the simplest technique is simply to hire people in low-wage countries to click on your ads using a proxy server.

- ◆ **Viewability:** Ads are not in fact seen by people, even though advertisers were charged for generating ad impressions and serving ads.
- ◆ **Ad Blocking:** Ad blockers operate in a manner very similar to a firewall, recognizing based on IP address and eliminating display ads, pre-roll video ads, retargeted ads, and some types of native ads on desktops and laptops.

Creating and Maintaining Brands on the Web

Elements of Branding

Element	Meaning to Customer
Differentiation	In what significant ways is this product or service unlike its competitors?
Relevance	How does this product or service fit into my life?
Perceived Value	Is this product or service good?

- The key elements of a brand are differentiation, relevance, and perceived value.
- Product **differentiation** is the first condition that must be met to create a product or service brand. The company must clearly distinguish its product from all others in the market.

This makes branding difficult for commodity products such as salt, nails, or plywood—difficult, but not impossible.

- The second element of branding—**relevance**—is the degree to which the product offers
- utility to a potential customer. The brand only has meaning to customers if they can visualize its place in their lives.
- The third branding component—**perceived value**—is a key element in creating a brand that has value. Even if your product is different from others on the market and potential customers can see themselves using this product, they will not buy it unless they perceive value.
- If a brand has established that it is different from competing brands and that it is relevant and inspires a perception of value to potential purchasers, those purchasers will buy the product and become familiar with how it provides value.
- Brands become established only when they reach this level of purchaser understanding and acceptance. Unfortunately, brands can lose their value if the environment in which they have become successful changes.

Emotional vs. Rational Branding

- Companies have traditionally used emotional appeals in their advertising and promotion efforts to establish and maintain brands.
- A branding expert, Ted Leonhardt, has described “brand” as “an emotional shortcut between a company and its customer”.
- By nature, human beings are emotional creatures. Businesses use a variety of techniques to appeal to consumer emotions. Advertisers take the time to carefully choose every detail, including the tone, lighting, color scheme and mood the

advertisement sets. Advertisers also appeal to fear, empathy, sympathy, happiness and other human emotions.

- These emotional appeals work well on television, radio, billboards, and in print media, because the ad targets are in a passive mode of information acceptance. However, emotional appeals are difficult to convey on the Web because it is an active medium controlled to a great extent by the customer.
- Many Web users are actively engaged in such activities as finding information, buying airline tickets, making hotel reservations, and obtaining weather forecasts. These users are busy people who will rapidly click away from emotional appeals.
- Marketers are attempting to create and maintain brands on the Web by using rational branding. Companies that use rational branding offer to help Web users in some way in exchange for their viewing an ad. Rational branding relies on the cognitive appeal of the specific help offered, not on a broad emotional appeal.
- This method attempts to prove the product's quality and usefulness to the consumer. Forms of proof may include stating the product's benefits, performing a product demonstration or citing facts or statistics. When the advertiser uses rational appeal, it is also appealing to the consumer's logic, persuading the consumer to choose the result it desires.

Cost of Branding

- Transferring existing brands to the Web or using the Web to maintain an existing brand is much easier and less expensive than creating an entirely new brand on the Web.

- In 1998, a large number of companies began spending significant amounts of money to build new brands on the Web. According to studies by the Intermarket Group, the top 100 electronic commerce sites each spent an average of \$8 million that year to create and build their online brands.
- Two of the top spenders included the battling websites Amazon.com, which spent \$133 million, and BarnesandNoble.com, which spent \$70 million. Most of this spending was for television, radio, and print media—not for online advertising.
- Online brokerages E*TRADE and Ameritrade Holding were also among the top five in that first year of major brand building on the Web, spending \$71 million and \$44 million, respectively.
- Promoting any company's Web presence should be an integral part of brand development and maintenance.
- The company's URL should always be included on product packaging and in mass media advertising on radio, television, and in print.
- Integrating the URL with the company logo on brochures can also be helpful in getting the word out about the website. Ensuring that the site appears in search engine listings is also very important.

Leveraging Branding Strategies

- A brand leveraging strategy uses the power of an existing brand name to support a company's entry into a new, but related, product category.
- Brand leveraging communicates valuable product information to consumers about new products. Consumers enter retail outlets equipped with pre-existing knowledge of a brand's

level of quality and consistently relate this knowledge to new products carrying the familiar brand. Generally, consumers maintain a consistent brand perception until disappointed – creating a risky advantage for established brands.

- Brand leveraging is an important form of new product introduction because it provides consumers with a sense of familiarity by carrying positive brand characteristics and attitudes into a new product category. Instant recognition of the brand is established, and consumers with a favorable brand opinion likely will try a new product they perceive to have a similar quality level and attributes as their original favorite.
- Amazon.com's expansion from its original book business into CDs, videos, and auctions is an example of a website leveraging its dominant position by adding features that are useful to existing customers.



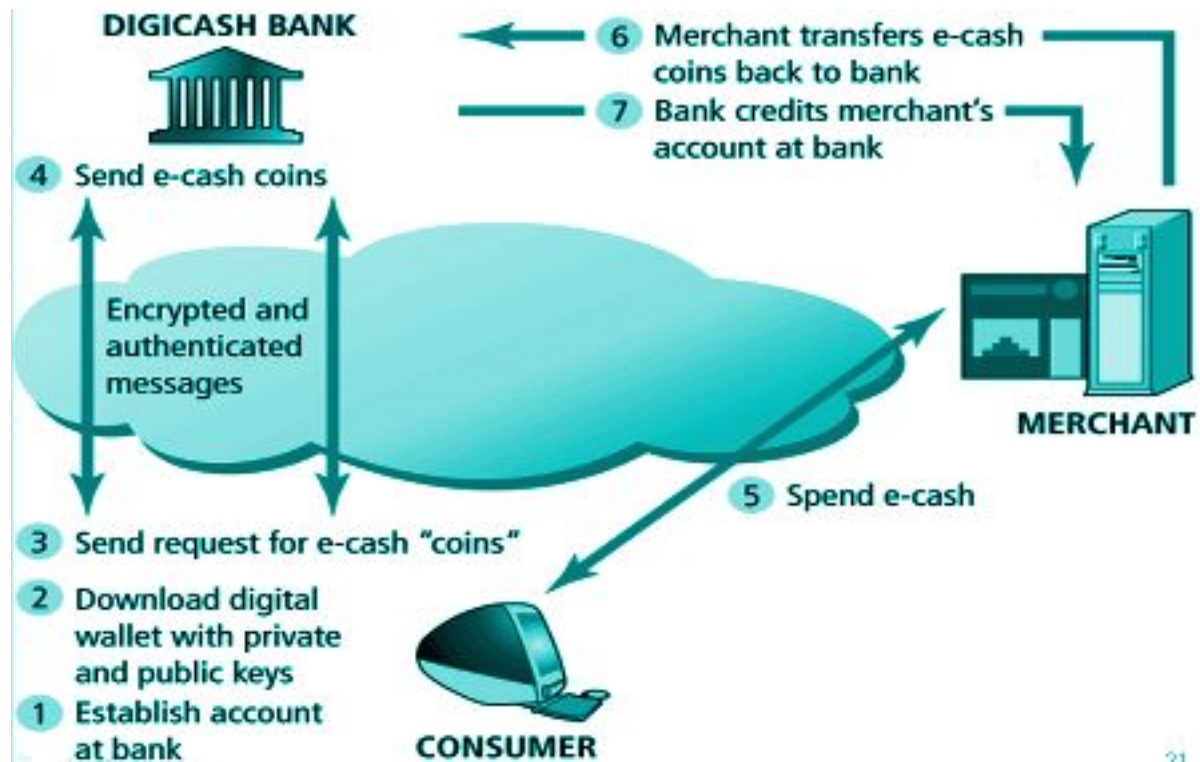
Chapter 5. E-Commerce Payment Systems

Online Payment Basics

- An important function of electronic commerce sites is the handling of payments over the Internet. Most electronic commerce involves the exchange of some form of money for goods or services.
- For the most part, existing payment mechanisms such as cash, credit cards, debit cards, checking accounts, and stored value accounts have been able to be adapted to the online environment, albeit with some significant limitations that have led to efforts to develop alternatives.

Online Payment Modes

Electronic Cash

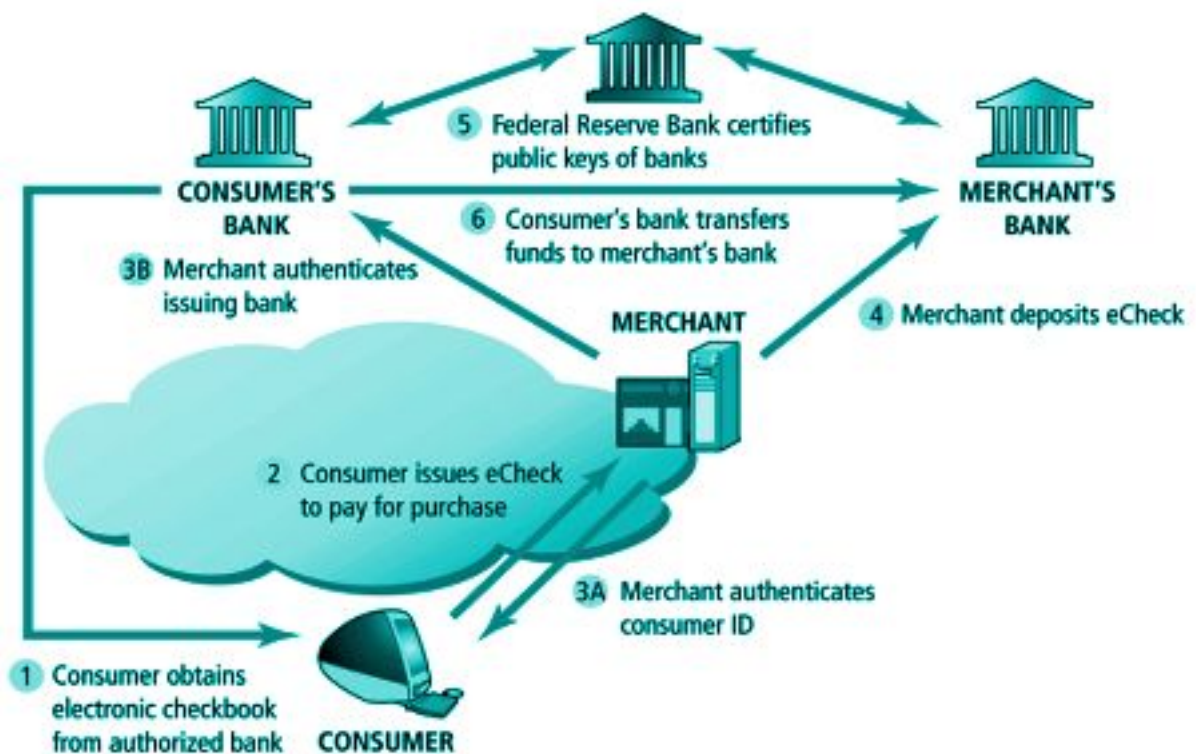


- Electronic cash (also called e-cash or digital cash) is a general term that describes any value storage and exchange system created by a private (non-governmental) entity that does not use paper documents or coins and that can serve as a substitute for government-issued physical currency.
- A significant difference between electronic cash and scrip is that electronic cash can be readily exchanged for physical cash on demand. Because electronic cash is issued by private entities, there is a need for common standards among all electronic cash issuers so that one issuer's electronic cash can be accepted by another issuer.
- This need has not yet been met. Each issuer has its own standards and electronic cash is not universally accepted, as is government-issued physical currency.
- Small purchases are not profitable for merchants that accept only credit cards for payment. There is a market for small

purchases on the Internet—purchases below \$10. This is one potentially significant market for electronic cash.

- With very low fixed costs, electronic cash provides the promise of allowing users to spend, for example, 50 cents for an online newspaper, or 80 cents to send an electronic greeting card.
- Electronic cash has another factor in its favor: Most of the world's population do not have credit cards. Many adults cannot obtain credit cards due to minimum income requirements or past debt problems. Children and teens—eager purchasers representing a significant percentage of online buyers—are ineligible, simply because they are too young.
- Electronic cash should have two important characteristics in common with physical currency. First, it must be possible to spend electronic cash only once, just as with traditional currency. Second, electronic cash ought to be anonymous, just as hard currency is.
- Examples: CheckFree, ClickShare, PayPal, etc.

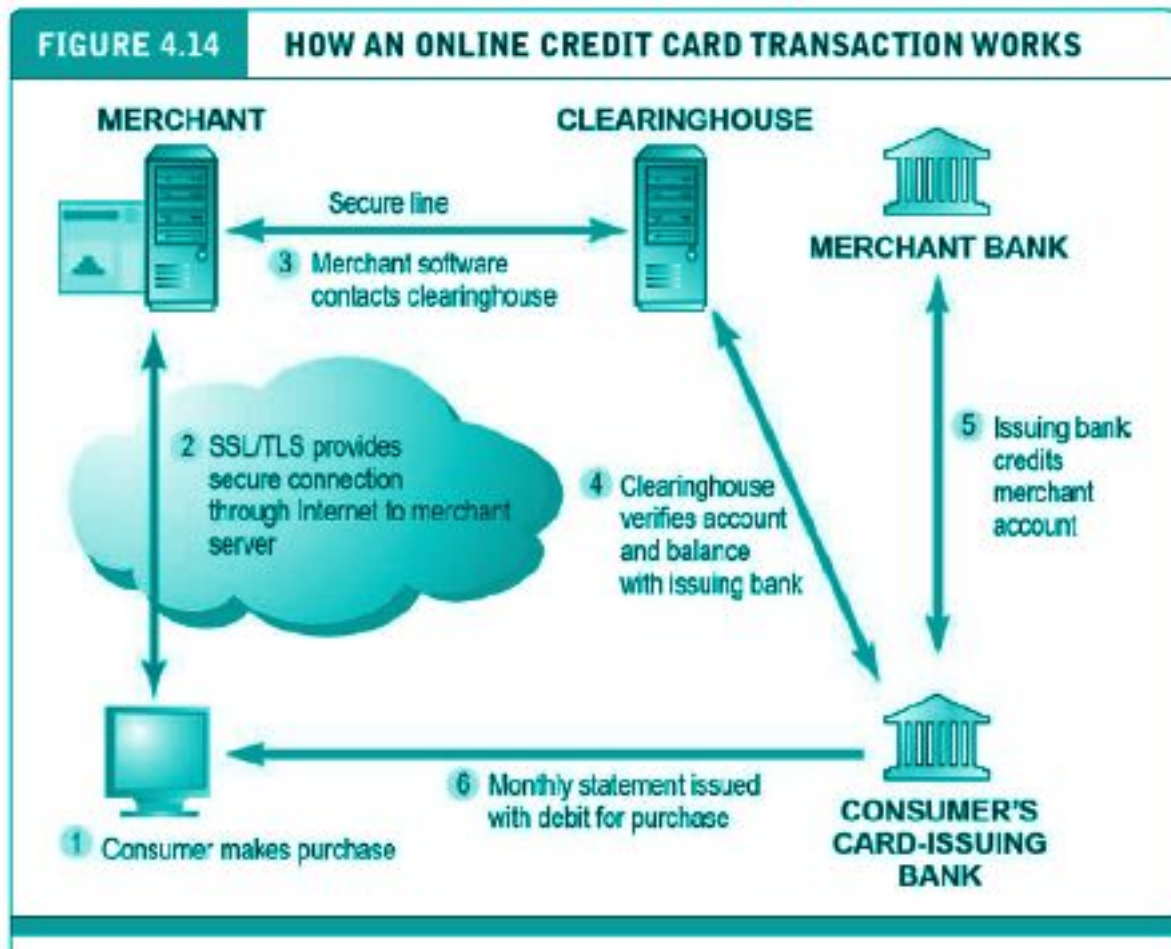
Electronic Check



- An electronic check, also referred to as an e-check, is a form of payment made via the internet, or other data network, designed to perform the same function as a conventional paper check. Since the check is in an electronic format, it can be processed in fewer steps. Additionally, it has more security features than standard paper checks including authentication, public key cryptography, digital signatures and encryption, among others.
- Generally, the costs associated with issuing an electronic check are notably lower than those associated with paper checks. Not only is there no requirement for a physical paper check, which costs money to produce, electronic checks do not require physical postage in cases of payments being made to entities outside of the direct reach of the entity issuing the funds. It is estimated that while a traditional check may cost as much as \$1 to issue, an electronic check costs closer to \$0.10.

- Electronic checks also come with a lower risk of the associated funds being stolen, as there is no tangible item to intercept. Further, there are multiple levels of authentication to help ensure funds are routed properly.

Electronic Payment Cards



- Businesspeople often use the term payment card as a general term to describe all types of plastic cards that consumers (and some businesses) use to make purchases. The main categories of payment cards are credit cards, debit cards, and charge cards.
- A credit card, such as a Visa or a MasterCard, has a spending limit based on the user's credit history; a user can pay off the entire credit card balance or pay a minimum amount each

billing period. Credit card issuers charge interest on any unpaid balance. Credit cards are widely accepted by merchants around the world and provide assurances for both the consumer and the merchant. Online credit card purchases are similar to telephone purchases in that the cardholder is not present and cannot provide proof of identity as easily as he or she can when standing at the cash register. Online and telephone purchases are often called card not present(CNP) transactions and both require an extra degree of security.

- A debit card looks like a credit card, but it works quite differently. Instead of charging purchases against a credit line, a debit card removes the amount of the sale from the cardholder's bank account and transfers it to the seller's bank account. Debit cards are issued by the cardholder's bank and usually carry the name of a major credit card issuer, such as Visa or MasterCard, by agreement between the issuing bank and the credit card issuer. By branding their debit cards (with the Visa or MasterCard name), banks ensure that their debit cards will be accepted by merchants who recognize the credit card brand names.
- A charge card, offered by companies such as American Express, carries no spending limit, and the entire amount charged to the card is due at the end of the billing period. Charge cards do not involve lines of credit and do not accumulate interest charges. In the United States, many retailers, such as department stores and oil companies that own gas stations, issue their own charge cards.

Digital Wallets

- An electronic wallet (sometimes called an e-wallet), serving a function similar to a physical wallet, holds credit card

numbers, electronic cash, owner identification, and owner contact information and provides that information at an electronic commerce site's checkout counter.

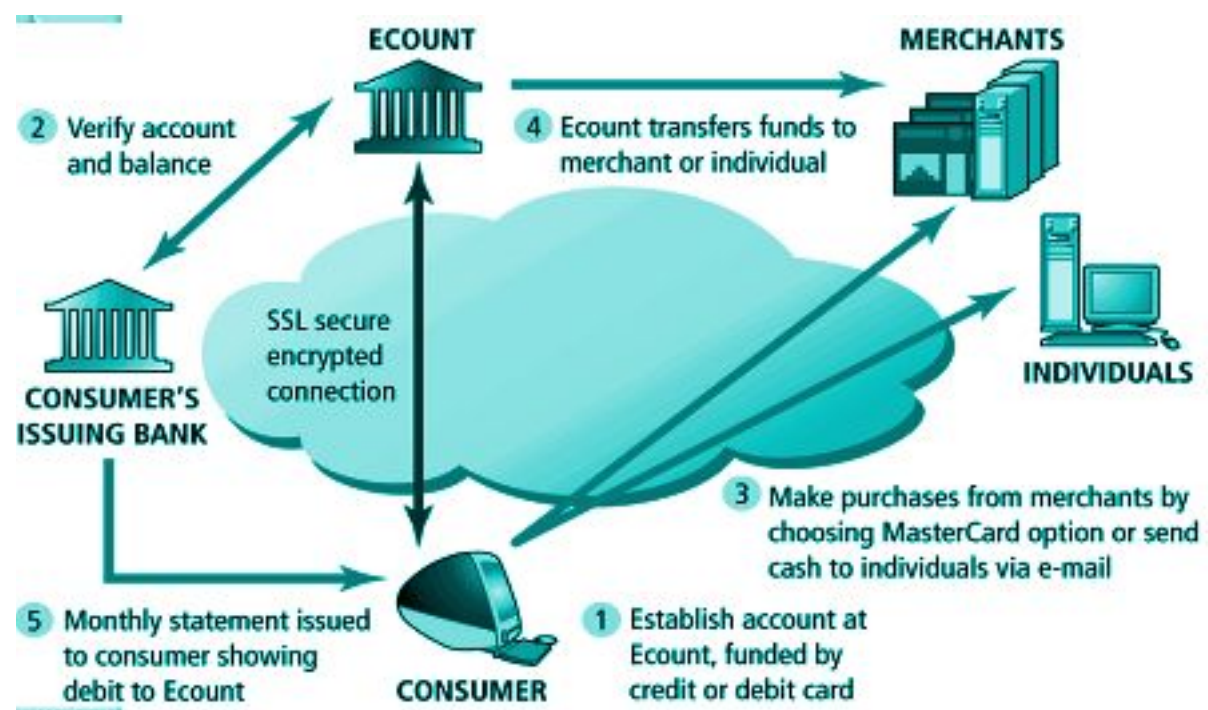
- Electronic wallets give consumers the benefit of entering their information just once, instead of having to enter their information at every site with which they want to do business.
- Electronic wallets make shopping more efficient. When consumers select items to purchase, they can then click their electronic wallet to order the items quickly.
- In the future, wallets could serve their owners by tracking purchases and maintaining receipts for those purchases.
- Electronic wallets fall into two categories based on where they are stored.
- A server-side electronic wallet stores a customer's information on a remote server belonging to a particular merchant or wallet publisher. The main weakness of server-side electronic wallets is that a security breach could reveal thousands of users' personal information—including credit card numbers—to unauthorized parties. Typically, server-side electronic wallets employ strong security measures that minimize the possibility of unauthorized disclosure.
- A client-side electronic wallet stores a consumer's information on his or her own computer. Many of the early electronic wallets were client-side wallets that required users to download the wallet software. This need to download software onto every computer used to make purchases is a chief disadvantage of client-side wallets.
- Server-side wallets, on the other hand, remain on a server and thus require no download time or installation on a user's computer. Before a consumer can use a server-side wallet on a

particular merchant's site, the merchant must enable that specific wallet.

- Each wallet vendor must convince a large number of merchants to enable its wallet before it will be accepted by consumers. Thus, only a few server-side wallet vendors will be able to succeed in the market.
- A disadvantage of client-side wallets is that they are not portable. For example, a client-side wallet is not available when a purchase is made from a computer other than the computer on which the wallet resides.
- In a client-side electronic wallet, the sensitive information (such as credit card numbers) is stored on the user's computer instead of the wallet provider's central server. This removes the risk that an attack on a client-side electronic wallet vendor's server could reveal the sensitive information. However, an attack on the user's computer could yield that information.
- Most security analysts agree that storing sensitive information on client computers is safer than storing that information on the vendor server because it requires attackers to launch many attacks on user computers, which are more difficult to identify (even though the user computers are less likely than a vendor server to have strong security features installed). It also prevents the easily identified servers of the wallet vendors from being attractive targets for such attacks.
- For a wallet to be useful at many online sites, it should be able to populate the data fields in any merchant's forms at any site that the consumer visits. This accessibility means that the electronic wallet manufacturer and merchants from many sites must coordinate their efforts so that a wallet can recognize what consumer information goes into each field of a given merchant's forms.

- Electronic wallets store shipping and billing information, including a consumer's first and last names, street address, city, state, country, and postal code.
- Most electronic wallets also can hold many credit card names and numbers, affording the consumer a choice of credit cards at the online checkout.
- Some electronic wallets also hold electronic cash from various providers. A number of companies entered the electronic wallet business, including major firms such as MasterCard. Most of these companies have abandoned their efforts because current versions of all major browsers now include a feature that remembers names, addresses, and other commonly requested information and provides a one-click completion of fields on Web forms that request that information.
- Two survivors in the e-wallet arena are Microsoft .NET Passport and Yahoo! Wallet.

Stored Value Payment

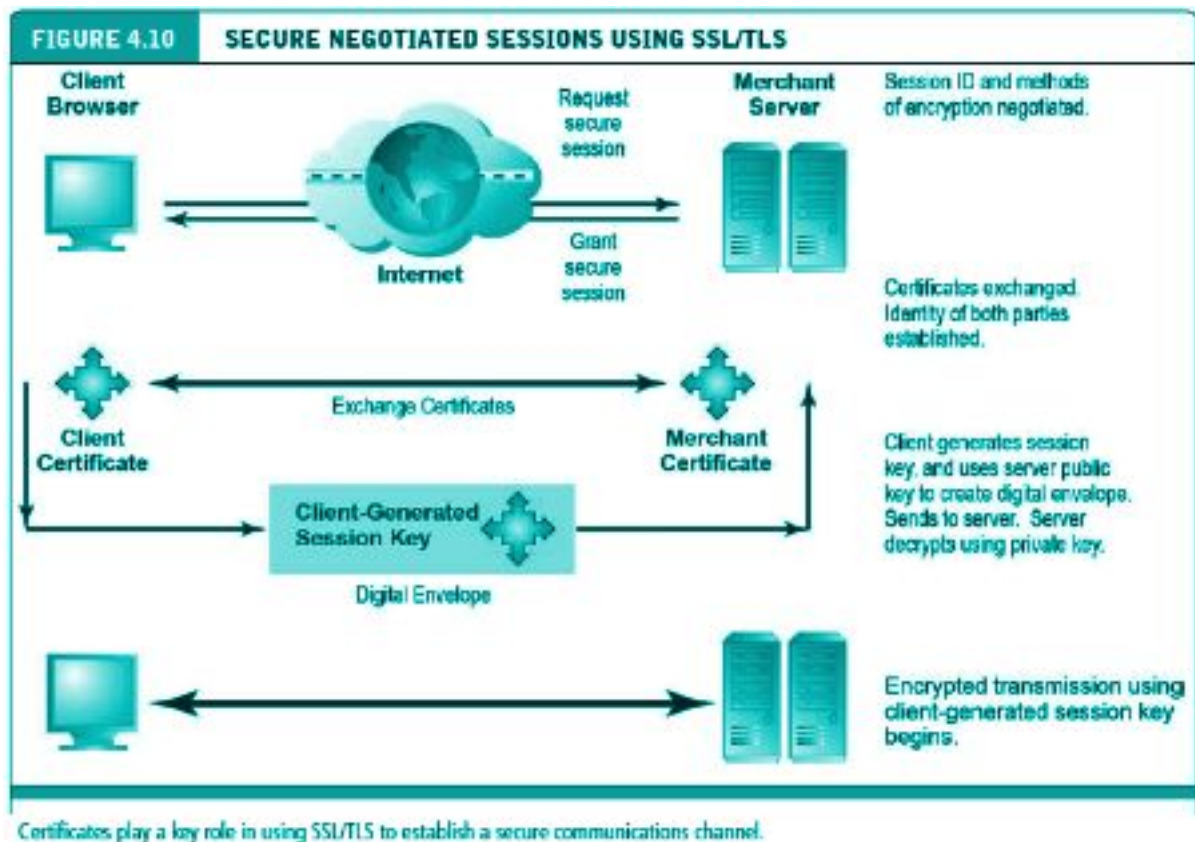


- Today, most people carry a number of plastic cards—credit cards, debit cards, charge cards, driver's license, health insurance card, employee or student identification card, and others.
- One solution that could reduce all those cards to a single plastic card is called a stored-value card.
- A stored-value card can be an elaborate smart card with a microchip or a plastic card with a magnetic strip that records the currency balance.
- The main difference is that a smart card can store larger amounts of information and includes a processor chip on the card.
- The card readers needed for smart cards are different, too. Common stored-value cards include prepaid phone, copy, subway, and bus cards. Many people use the terms "stored-value card" and "smart card" interchangeably.
- Magnetic Strip Cards
 - ◆ Most magnetic strip cards hold value that can be recharged by inserting them into the appropriate machines, inserting currency into the machine, and withdrawing the card; the card's strip stores the increased cash value. Magnetic strip cards are passive; that is, they cannot send or receive information, nor can they increment or decrement the value of cash stored on the card. The processing must be done on a device into which the card is inserted. Although both magnetic strip cards and smart cards can store electronic cash, a smart card is better suited for Internet payment transactions because it has some processing capability.
- Smart Cards

- ◆ A smart card is a stored-value card that is a plastic card with an embedded microchip that can store information. Credit, debit, and charge cards currently store limited information on a magnetic strip. A smart card can store about 100 times the amount of information that a magnetic strip plastic card can store. A smart card can hold private user data, such as financial facts, encryption keys, account information, credit card numbers, health insurance information, medical records, and so on. Smart cards are safer than conventional credit cards because the information stored on a smart card is encrypted. With a smart card, credit theft is much more difficult because the key to unlock the encrypted information is a PIN; there is no visible number on the card that a thief can identify, nor is there a physical signature on the card that a thief can see and use as an example for a forgery.

Security Protocols

Secure Socket Layer (SSL)



- SSL/TLS provides data encryption, server authentication, optional client authentication, and message integrity for TCP/IP connections. SSL/TLS addresses the issue of authenticity by allowing users to verify another user's identity or the identity of a server. It also protects the integrity of the messages exchanged.
- When you receive a message from a server on the Web with which you will be communicating through a secure channel, this means you will be using SSL/TLS to establish a secure negotiated session. (Notice that the URL changes from HTTP to HTTPS.)
- A secure negotiated session is a client-server session in which the URL of the requested document, along with the contents, contents of forms, and the cookies exchanged, are encrypted.

- Through a series of handshakes and communications, the browser and the server establish one another's identity by exchanging digital certificates, decide on the strongest shared form of encryption, and then proceed to communicate using an agreed-upon session key.
- A session key is a unique symmetric encryption key chosen just for this single secure session. Once used, it is gone forever.
- In practice, most private individuals do not have a digital certificate. In this case, the merchant server will not request a certificate, but the client browser will request the merchant certificate once a secure session is called for by the server.
- Once the merchant receives the encrypted credit and order information, that information is typically stored in unencrypted format on the merchant's servers. While SSL/TLS provides secure transactions between merchant and consumer, it only guarantees server-side authentication. Client authentication is optional.
- In addition, SSL/TLS cannot provide irrefutability—consumers can order goods or download information products, and then claim the transaction never occurred.

Secure Electronic Transaction Protocol (SET)

SET Transactions

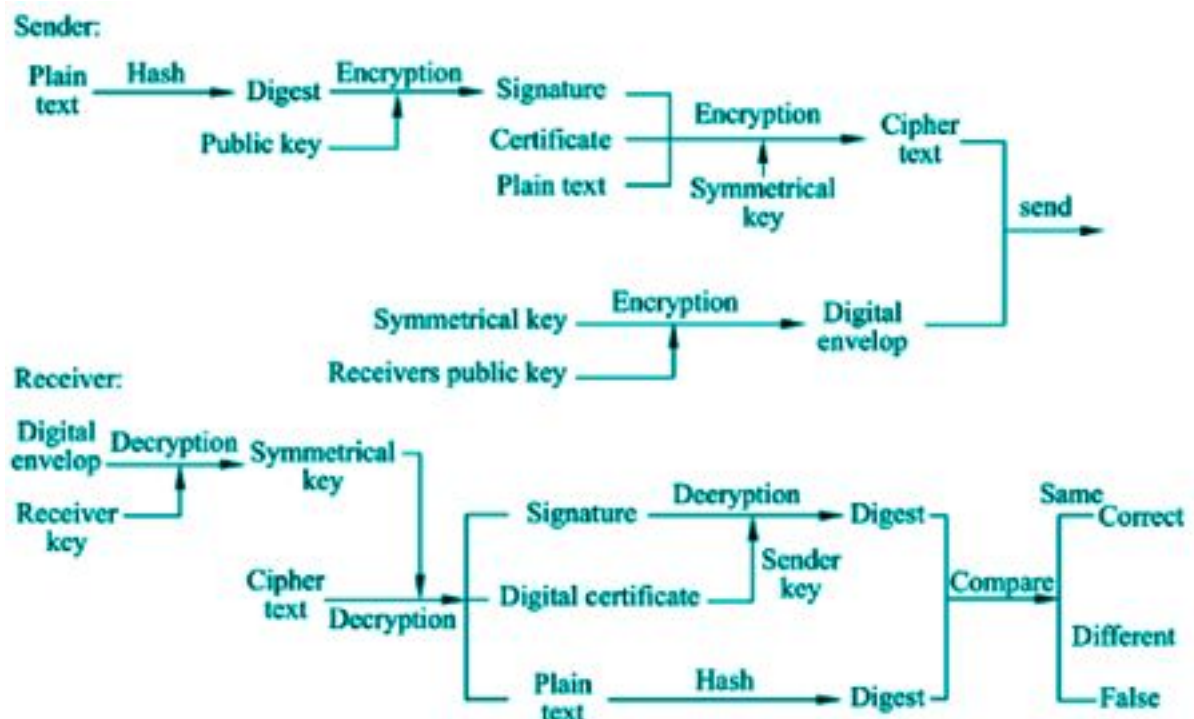
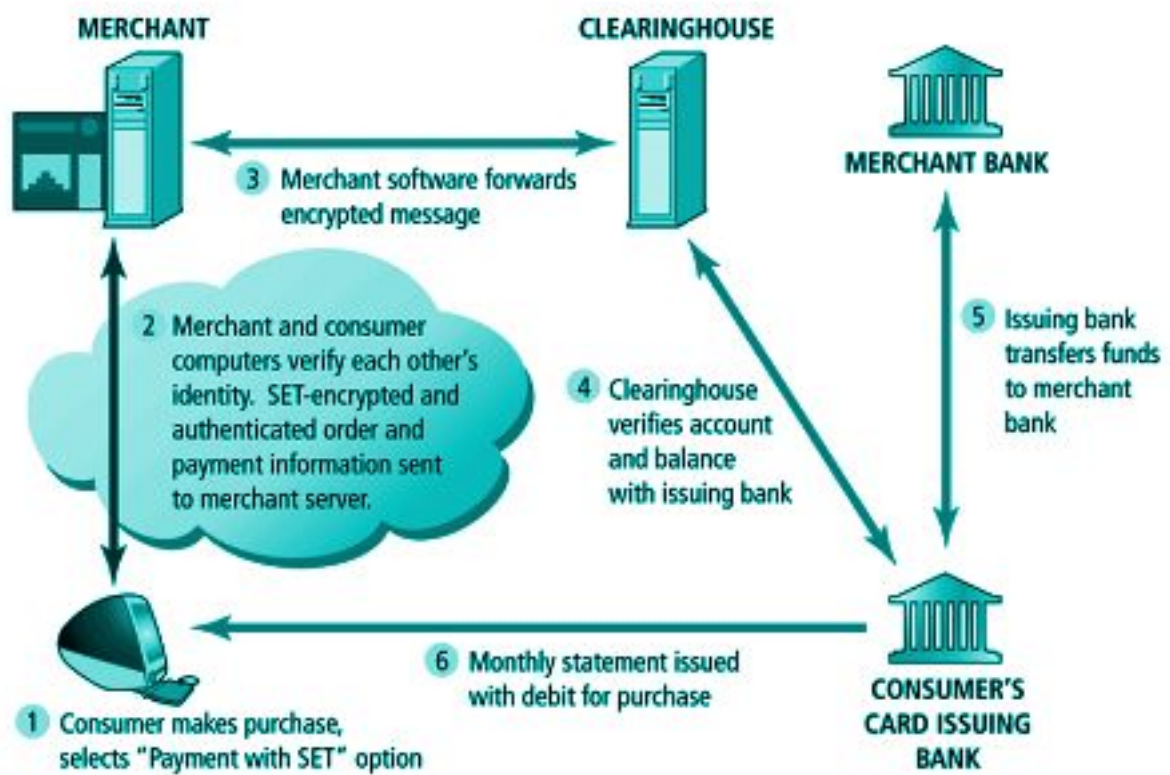


Figure 4.10 Data encryption model used by SET protocol

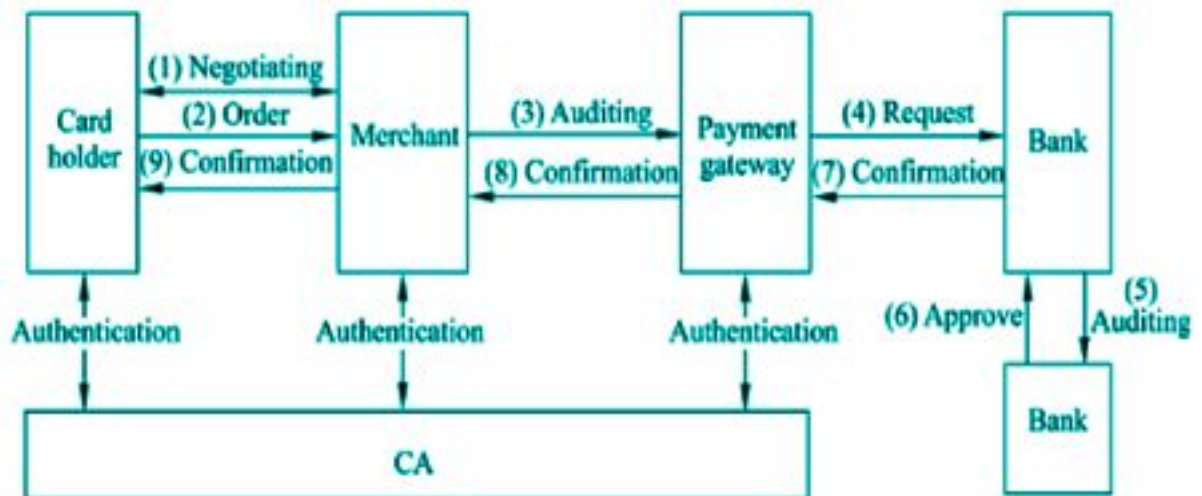


Figure 4.11 Data interchange process of SET protocol

- Secure Electronic Transaction (SET) was a communications protocol standard for securing credit card transactions over insecure networks, specifically, the Internet.
- SET was not itself a payment system, but rather a set of security protocols and formats that enabled users to employ the existing credit card payment infrastructure on an open network in a secure fashion.
- However, it failed to gain attraction in the market. VISA now promotes the 3-D Secure scheme.
- To meet the business requirements, SET incorporates the following features:
 - ◆ Confidentiality of information
 - ◆ Integrity of data
 - ◆ Cardholder account authentication
 - ◆ Merchant authentication
- A SET system includes the following participants:
 - ◆ Cardholder
 - ◆ Merchant
 - ◆ Issuer
 - ◆ Acquirer

- ◆ Payment gateway
- ◆ Certification authority

→ Working:

- ◆ Both cardholders and merchants must register with CA (certificate authority) first, before they can buy or sell on the Internet. Once registration is done, cardholder and merchant can start to do transactions, which involve 9 steps:

- Customer browses website and decides on what to purchase
- Customer sends order and payment information, which includes 2 parts in one message:
 - Purchase Order – this part is for merchant
 - Card Information – this part is for merchant's bank only.
- Merchant forwards card information (part b) to their bank
- Merchant's bank checks with Issuer for payment authorization
- Issuer send authorization to Merchant's bank
- Merchant's bank send authorization to merchant
- Merchant completes the order and sends confirmation to the customer
- Merchant captures the transaction from their bank
- Issuer prints credit card bill (invoice) to customer



Chapter 6. E-Commerce Security

Need of Security in E-Commerce

- Customer information, business details and payment details are all highly sensitive commodities that are shared during an e-commerce transaction.
- Businesses often fall prey to hacking and data breaches. This is often due to insufficient security measures.
- It is inevitable that customers will buy from and use a website that has proper security measures in place.
- Cybercrime is becoming a more significant problem for both organizations and consumers. Bot networks, DDoS attacks, Trojans, phishing, ransomware, data theft, identity fraud, credit card fraud, and spyware are just some of the threats that are making daily headlines.
- Social networks also have had security breaches. But despite the increasing attention being paid to cybercrime, it is difficult to accurately estimate the actual amount of such crime, in part because many companies are hesitant to report it due to the fear of losing the trust of their customers, and because even if crime is reported, it may be difficult to quantify the actual dollar amount of the loss.

Dimensions of E-Commerce Security

- **Integrity** refers to the ability to ensure that information being displayed on a website, or transmitted or received over the Internet, has not been altered in any way by an unauthorized party.

- **Nonrepudiation** refers to the ability to ensure that e-commerce participants do not deny (i.e., repudiate) their online actions.
- **Authenticity** refers to the ability to identify the identity of a person or entity with whom you are dealing on the Internet.
- **Confidentiality** refers to the ability to ensure that messages and data are available only to those who are authorized to view them.
- **Privacy** refers to the ability to control the use of information a customer provides about himself or herself to an e-commerce merchant. E-commerce merchants must establish internal policies that govern their own use of customer information, and they must protect that information from illegitimate or unauthorized use.
- **Availability** refers to the ability to ensure that an e-commerce site continues to function as intended.

Security for the Clients

Cookies

- Cookies allow web servers to maintain continuing open sessions with web clients for features such as shopping cart and payment processing software.
- Cookies were invented to solve the stateless connection problem by saving information about a Web user from one set of server-client message exchanges to another.
- There are two ways of categorizing cookies: by time duration and by source. The two kinds of time duration cookie categories include session cookies, which exist until the Web client ends the connection (or “session”), and persistent cookies, which remain on the client computer indefinitely.

- Electronic commerce sites use both kinds of cookies. For example, a session cookie might contain information about a particular shopping visit and a persistent cookie might contain login information that can help the website recognize visitors when they return to the site on subsequent visits.
- Each time a browser moves to a different part of a merchant's website, the merchant's web server asks the visitor's computer to send back any cookies that the web server stored previously on the visitor's computer.
- Another way of categorizing cookies is by their source. Cookies can be placed on the client computer by the web server site, in which case they are called first-party cookies, or they can be placed by a different website, in which case they are called third-party cookies.
- A third-party cookie originates on a website other than the site being visited. These third-party websites usually provide advertising or other content that appears on the website being viewed. The third-party website providing the advertising is often interested in tracking responses to their ads by visitors who have already seen the ads on other sites. If the advertising website places its ads on a large number of websites, it can use persistent third-party cookies to track visitors from one site to another.
- The most complete way for website visitors to protect themselves from revealing private information or being tracked by cookies is to disable cookies entirely. The problem with this approach is that useful cookies are blocked along with the others, requiring visitors to enter information each time they revisit a website. The full resources of some sites are not available to visitors unless their browsers are set to allow cookies.

- Most Web browsers have settings that allow the user to refuse only third-party cookies or to review each cookie before it is accepted. The best way to avoid tracking is to use browser extensions such as Disconnect or Ghostery.

Web Bugs

- Some advertisers send images (from their third-party servers) that are included on web pages, but are too small to be visible.
- A Web bug is a tiny graphic that a third-party website places on another site's web page. When a site visitor loads the web page, the web bug is delivered by the third-party site, which can then place a cookie on the visitor's computer.
- A web bug's only purpose is to provide a way for a third-party website (the identity of which is unknown to the visitor) to place cookies from that third-party site on the visitor's computer.
- The Internet advertising community sometimes calls web bugs "clear GIFs" or "1-by-1 GIFs" because the graphics can be created in the GIF format with a color value of "transparent" and can be as small as 1 pixel by 1 pixel.

Active Content

- Active content refers to programs that are embedded transparently in web pages and that cause action to occur.
- For example, active content can display moving graphics, download and play audio, or implement web-based spreadsheet programs.
- Active content is used in electronic commerce to place items into a shopping cart and compute a total invoice amount, including sales tax, handling, and shipping costs.

- Developers use active content because it extends the functionality of HTML and moves some data processing chores from the busy server machine to the user's client computer.
- Unfortunately, because active content elements are programs that run on the client computer, active content can damage the client computer. Thus, active content can pose a threat to the security of client computers.
- Active content is provided in several forms. The best-known active content forms are cookies, Java applets, JavaScript, VBScript, and ActiveX controls.
- Other ways to provide web active content include graphics, web browser plug-ins, and email attachments.
- JavaScript and VBScript are scripting languages; they provide scripts, or commands, that are executed.
- An applet is a small application program. Applets typically run within the Web browser.
- Active content is launched in a web browser automatically when that browser loads a web page containing active content. The applet downloads automatically with the page and begins running.
- Depending on how the browser's security settings are configured, the browser might open a warning dialog box, announcing the active content and asking the user for permission to open that content.
- Because active content modules are embedded in web pages, they can be completely transparent to anyone browsing a page containing them.
- Crackers who intend on doing mischief to client computers can embed malicious active content in these seemingly innocuous web pages. This delivery technique is called a Trojan horse.

- A Trojan horse is a program hidden inside another program or web page that masks its true purpose. The Trojan horse could snoop around a client computer and send back private information to a cooperating web server—a secrecy violation.
- The program could alter or erase information on a client computer—an integrity violation.
- Zombies are equally threatening. A zombie is a Trojan horse that secretly takes over another computer for the purpose of launching attacks on other computers. The computers running the zombie are also sometimes called zombies. Zombie attacks can be very difficult to trace to their creators.

ActiveX Controls

- An ActiveX control is an object that contains programs and properties that Web designers place on web pages to perform particular tasks.
- ActiveX components can be constructed using many different programming languages, but the most common are C++ and Visual Basic.
- Unlike Java or JavaScript code, ActiveX controls run only on computers with Windows operating systems.
- When a Windows-based Web browser downloads a web page containing an embedded ActiveX control, the control is executed on the client computer.
- Other ActiveX controls include Web-enabled calendar controls and Web games.
- The security danger with ActiveX controls is that once they are downloaded, they execute like any other program on a client computer. They have full access to all system resources, including operating system code.

- An ill-intentioned ActiveX control could reformat a user's hard disk, rename or delete files, send emails to all the people listed in the user's address book, or simply shut down the computer.
- Because ActiveX controls have full access to client computers, they can cause secrecy, integrity, or necessity violations.
- The actions of ActiveX controls cannot be halted once they begin execution. Most Web browsers can be configured to provide a notice when the user is about to download an ActiveX control.

Graphics and Plug-Ins

- Graphics, browser plug-ins, and email attachments can harbor executable content. Some graphics file formats have been designed specifically to contain instructions on how to render a graphic.
- That means that any web page containing such a graphic could be a threat because the code embedded in the graphic could cause harm to a client computer.
- Similarly, browser plug-ins, which are programs that enhance the capabilities of browsers, handle Web content that a browser cannot handle.
- Plug-ins are normally beneficial and perform tasks for a browser, such as playing audio clips, displaying movies, or animating graphics.
- Plug-ins can also pose security threats to a client computer. Users download these plug-in programs and install them so their browsers can display content that cannot be included in HTML tags.

- Popular plug-ins include Macromedia's Flash Player and Shockwave Player, Apple's QuickTime Player, and RealNetworks' RealPlayer.
- Many plug-ins execute commands buried within the media being manipulated. This opens the door to the possibility that someone intent on doing harm could embed commands within a seemingly innocuous video or audio clip.
- The ill-intentioned commands hidden within the object that the plug-in is interpreting could damage a client computer by erasing some (or all) of its files.

Virus

- A computer virus is a type of malicious software program ("malware") that, when executed, replicates by reproducing itself (copying its own source code) or infecting other computer programs by modifying them.
- It can infect data files, or the "boot" sector of the hard drive. When this replication succeeds, the affected areas are then said to be "infected" with a computer virus.
- Viruses often perform some type of harmful activity on infected host computers, such as acquisition of hard disk space or central processing unit (CPU) time, accessing private information (e.g., credit card numbers), corrupting data, displaying political or humorous messages on the user's screen, spamming their email contacts, logging their keystrokes, or even rendering the computer useless.

Worm

- A computer worm is a standalone malware computer program that replicates itself in order to spread to other computers.

Often, it uses a computer network to spread itself, relying on security failures on the target computer to access it.

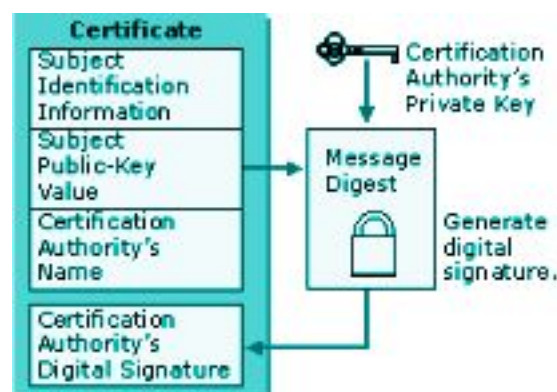
- Worms almost always cause at least some harm to the network, even if only by consuming bandwidth, whereas viruses almost always corrupt or modify files on a targeted computer.
- Many worms that have been created are designed only to spread, and do not attempt to change the systems they pass through.

Antivirus Software

- Antivirus or anti-virus software (often abbreviated as AV) is computer software used to prevent, detect and remove malicious software.
- Modern antivirus software can protect from: malicious browser helper objects (BHOs), browser hijackers, ransomware, keyloggers, backdoors, rootkits, trojan horses, worms, malicious LSPs, dialers, fraud-tools, adware and spyware.
- Antivirus software is only effective if the antivirus data files are kept current. The data files contain virus-identifying information that is used to detect viruses on a client computer.
- Because people generate new viruses by the hundreds every month, users must be vigilant and update their antivirus data files regularly so that the newest viruses are recognized and eliminated.
- Some Web email systems, such as Yahoo! Mail, let users scan attachments using antivirus software before downloading email. In these cases, the antivirus software is run by the website and the user does not need to take any action to keep

the software updated. Symantec and Norton, among other companies, keep track of viruses and sell antivirus software.

Digital Certificates



- A digital certificate or digital ID is an attachment to an email message or a program embedded in a web page that verifies that the sender or website is who or what it claims to be.
- In addition, the digital certificate contains a means to send an encrypted message—encoded so others cannot read it—to the entity that sent the original web page or email message.
- In the case of a downloaded program containing a digital certificate, the encrypted message identifies the software publisher (ensuring that the identity of the software publisher matches the certificate) and indicates whether the certificate has expired or is still valid.
- Digital certificates are used for many different types of online transactions, including electronic commerce, electronic mail, and electronic funds transfers. A digital ID verifies a website to a shopper and, optionally, identifies a shopper to a website.
- Web browsers or email programs exchange digital certificates automatically and invisibly when requested to validate the identity of each party involved in a transaction.
- Digital certificates are issued by a certification authority (CA). A CA can issue digital certificates to organizations or

individuals. A CA requires entities applying for digital certificates to supply appropriate proof of identity. Once the CA is satisfied, it issues a certificate. Then, the CA signs the certificate, and its stamp of approval is affixed in the form of a public encryption key, which “unlocks” the certificate for anyone who receives the certificate attached to the publisher’s code.

- Digital certificates cannot be forged easily. A digital certificate includes six main elements, including:
 - ◆ Certificate owner’s identifying information, such as name, organization, address, and so on
 - ◆ Certificate owner’s public key
 - ◆ Dates between which the certificate is valid
 - ◆ Serial number of the certificate
 - ◆ Name of the certificate issuer
 - ◆ Digital signature of the certificate issuer
- A key is simply a number—usually a long binary number—that is used with the encryption algorithm to “lock” the characters of the message being protected so that they are undecipherable without the key.
- Certificates are classified as low, medium, or high assurance, based largely on the identification requirements imposed on certificate seekers.
- The fees charged by CAs vary with the level of assurance provided; higher levels of assurance are more expensive.
- Class 1 certificates are the lowest level and bind email addresses and associated public keys. Class 4 certificates apply to servers and the server organizations. Requirements for Class 4 certificates are significantly greater than those for Class 1.
- Digital certificates expire after a period of time (often one year). This built-in limit provides protection for both users

and businesses. Limited-duration certificates guarantee that businesses and individuals must submit their credentials for reevaluation periodically.

- The expiration date appears in the certificate itself and in the dialog boxes that browsers display when a web page or applet that has a digital certificate is about to be opened. Certificates become invalid on their expiration dates or when they are intentionally revoked by the CA.
- If the CA determines that a website has begun delivering malicious code, it will refuse to issue new certificates to that site and revoke any existing certificates it might already have obtained.

Steganography

- The term steganography describes the process of hiding information (a command, for example) within another piece of information. This information can be used for malicious purposes.
- Frequently, computer files contain redundant or insignificant information that can be replaced with other information. This other information resides in the background and is undetectable by anyone without the correct decoding software.
- Steganography provides a way of hiding an encrypted file within another file so that a casual observer cannot detect that there is anything of importance in the container file.
- In this two-step process, encrypting the file protects it from being read, and steganography makes it invisible.
- Messages hidden using steganography are extremely difficult to detect. This fact, combined with the fact that there are millions of images on the Web, makes the use of

steganography by global terrorist organizations a deep concern of governments and security professionals.

Physical Security for Clients

- In the past, physical security was a major concern for large computers that ran important business functions such as payroll or billing; however, as networks (including intranets and the Internet) have made it possible to control important business functions from client computers, concerns about physical security for client computers have become greater.
- Many of the physical security measures used today are the same as those used in the early days of computing; however, some interesting new technologies have been implemented as well.
- Devices that read fingerprints are now available for personal computers. These devices provide a much stronger protection than traditional password approaches.
- In addition to fingerprint readers, companies can use other biometric security devices that are more accurate and, of course, cost more.
- A biometric security device is one that uses an element of a person's biological makeup to perform the identification.
- These devices include writing pads that detect the form and pressure of a person writing a signature, eye scanners that read the pattern of blood vessels in a person's retina or the color levels in a person's iris, and scanners that read the palm of a person's hand (rather than just one fingerprint) or that read the pattern of veins on the back of a person's hand.

Security for the Servers

Web Server Threats

- Although web server software is not inherently high-risk software, it has been designed with web service and convenience as the main design goals. The more complex the software, the greater the probability that it contains coding errors or security weaknesses.
- A web server can compromise secrecy if it allows automatic directory listings. The secrecy violation occurs when the contents of a server's folder names are revealed to a Web browser.
- This happens frequently and is caused when a user enters a URL, such as `http://www.somecompany.com/FAQ/`, and expects to see the default page in the FAQ directory. The default web page that the server normally displays is named `index.htm` or `index.html`. If that file is not in the directory, a web server that allows automatic directory listings displays all of the file and folder names in that directory. Then, visitors can click folder names at random and open folders that might otherwise be off limits. Careful site administrators turn off this folder name display feature. If a user attempts to browse a folder where protections prevent browsing, the web server issues a warning message stating that the directory is not available.
- web servers can compromise security by requiring users to enter a username and password. The username and password can be subsequently revealed when the user visits multiple pages within the same web server's protected area, if the server requires that users reestablish their usernames and

passwords for each protected page they visit. The most convenient way to remember a username and password is to store the user's confidential information in an encrypted cookie on his or her computer.

- One of the most sensitive files on a web server is the file that holds web server username and password pairs. If that file is compromised, an intruder can enter privileged areas masquerading as someone else. Such an intruder can obtain usernames and passwords if that information is readily available and not encrypted.
- Most web servers store user authentication information in encrypted form. The passwords that users select can be a threat. Users sometimes select passwords that are guessed easily, such as mother's maiden name, name of a child, a telephone number, or some easily obtained identification number, such as a Social Security number.
- Dictionary attack programs cycle through an electronic dictionary, trying every word in the book as a password. Users' passwords, once broken, may provide an opening for illegal entry into a server that can remain undetected for a long time.
- To prevent dictionary attacks, many organizations use a dictionary check as a preventive measure in their password assignment software. When a user selects a new password, the password assignment software checks the password against its dictionary and, if it finds a match, refuses to allow the use of that password.
- An organization's password assignment software dictionary typically includes common words, names (including common pet names), acronyms that are commonly used in the organization, and words or characters (including numbers) that have some meaning for the user requesting the password

(for example, employees might be prohibited from using their employee numbers as passwords).

Database Threats

Attacks on databases are very common because databases are the heart of every organization; they store customer records and other sensitive business data.

- Excessive privileges: when workers are granted default database rights that exceed the requirements of their job functions, it is easy for these rights to be violated. Many companies also fail to revoke or update employee database rights, which may lead to malicious actions.
- Injection attack: consists of "insertion" of a SQL query via the input data from client to the application. A successful injection attack can:
 - ◆ read sensitive data from the database
 - ◆ modify database records perform admin operations on the database
 - ◆ issue commands to the OS
- Exploiting vulnerable databases: it generally takes organizations months to patch up databases during which they remain vulnerable. Hackers know how to exploit unpatched databases or databases that are still equipped with default accounts and configuration parameters. The challenge is finding an ideal time frame to maintain and patch databases.
- Unmanaged sensitive data: many companies struggle to maintain an accurate inventory of their databases and the critical data objects contained within them. Sensitive data in both old and new databases can be accessed by hackers if proper controls and permissions are not set.

- Human factor: I.T. and database security professionals may not have adequate knowledge on security mechanisms, enforcing of policies and conduction of important response processes.

Access Control and Authentication

- Access control and authentication refers to controlling who and what has access to the web server.
- Authentication is verification of the identity of the entity requesting access to the computer. Just as users can authenticate servers with which they are interacting, servers can authenticate individual users.
- When a server requires positive identification of a user, it requests that the client send a certificate. The server can authenticate a user by verifying the digital signature, checking the timestamp or by using a callback system that checks against a list of usernames and assigned client computer addresses.
- Usernames and passwords can also provide some element of protection. To authenticate users using passwords and usernames, the server must acquire and store a database containing rightful users' passwords and usernames.
- The easiest way to store passwords is to maintain usernames in plain text and encrypt passwords using a hashing algorithm. Passwords are not immune to discovery, and a person truly intent on stealing a password can often figure out a way to do so.
- The site visitor can save his or her username and password as a cookie on the client computer, which allows access without entering the username and password on subsequent site visits. If the cookie contains login and password information,

then that information is visible to anyone who has access to the user's computer.

- An access control list (ACL) is a list or database of files and other resources and the usernames of people who can access the files and other resources. Each file has its own access control list. When a client computer requests web server access to a file or document that has been configured to require an access check, the web server checks the resource's ACL file to determine if the user is allowed to access that file.
- This system is especially convenient to restrict access of files on an intranet server so that individuals can only access selected files on a need-to-know basis. The web server can exercise fine control over resources by further subdividing file access into the activities of read, write, or execute.

Firewall

- A firewall is a software and/or hardware that is installed in a network to control the packet traffic moving through it. Most organizations place a firewall at the Internet entry point of their networks.
- The firewall provides a defense between a network and the Internet or between a network and any other network that could pose a threat. Firewalls have the following characteristics:
 - ◆ All traffic from inside to outside and from outside to inside the network must pass through it.
 - ◆ Only authorized traffic, as defined by the local security policy, is allowed to pass through it.
 - ◆ The firewall itself is immune to penetration
- Firewalls are classified into the following categories: packet filter, gateway server, and proxy server.

- Packet-filter firewalls examine all data flowing back and forth between the trusted network (within the firewall) and the Internet. Packet filtering examines the source and destination addresses and ports of incoming packets and denies or permits entrance to the packets based on a preprogrammed set of rules.
- Gateway servers are firewalls that filter traffic based on the application requested. Gateway servers limit access to specific applications such as Telnet, FTP, and HTTP. Application gateways arbitrate traffic between the inside network and the outside network. In contrast to a packet-filter technique, an application-level firewall filters requests and logs them at the application level, rather than at the lower IP level. A gateway firewall provides a central point where all requests can be classified, logged, and later analyzed.
- Proxy server firewalls are firewalls that communicate with the Internet on the private network's behalf. When a browser is configured to use a proxy server firewall, the firewall passes the browser request to the Internet. When the Internet sends back a response, the proxy server relays it back to the browser. Proxy servers are also used to serve as a huge cache for web pages.
- Crackers spend a great deal of time and energy on attempts to enter the servers of organizations. Some of these crackers use automated programs to continually attempt to gain access to servers.
- Organizations often install intrusion detection systems as part of their firewalls. Intrusion detection systems are designed to monitor attempts to login to servers and analyze those attempts for patterns that might indicate a cracker's attack is underway.

- Once the intrusion detection system identifies an attack, it can block further attempts that originate from the same IP address until the organization's security staff can examine and analyze the access attempts and determine whether they are an attack.
- In addition to firewalls installed on organizations' networks, it is possible to install software-only firewalls on individual client computers. These firewalls are often called personal firewalls.

Physical Security of Web Servers

- web servers and the computers that are networked closely to them, such as the database
- servers and application servers used to supply content and transaction-processing capabilities to electronic commerce websites, must be protected from physical harm.
- For many companies, these computers have become repositories of important data (information about customers, products, sales, purchases, and payments).
- They have also become important parts of the revenue-generating function in many businesses. As key physical resources, these computers and related equipment warrant high levels of protection against threats to their physical security.
- Many companies use Cloud Service Providers(CSP) to host websites. Even large companies that own servers and have IT staff to maintain those servers often put the computers in a CSP facility.
- The security that CSPs maintain over their physical premises is, in many cases, stronger than the security that a company could provide for computers maintained at its own location.

- If the web server operation is critical to the continuation of the business, a company can maintain a duplicate of the entire web server physical facility at a remote location. In the case of a natural disaster or a terrorist attack, the Web operations can be switched over in a matter of seconds to the backup location.
- Some companies rely on their service providers to help with web server security.
- Other companies hire smaller, specialized security service providers to handle security.



Chapter 7. Legal, Ethical and Tax Issues in E-Commerce

The Legal Environment of Electronic Commerce

Borders and Jurisdiction

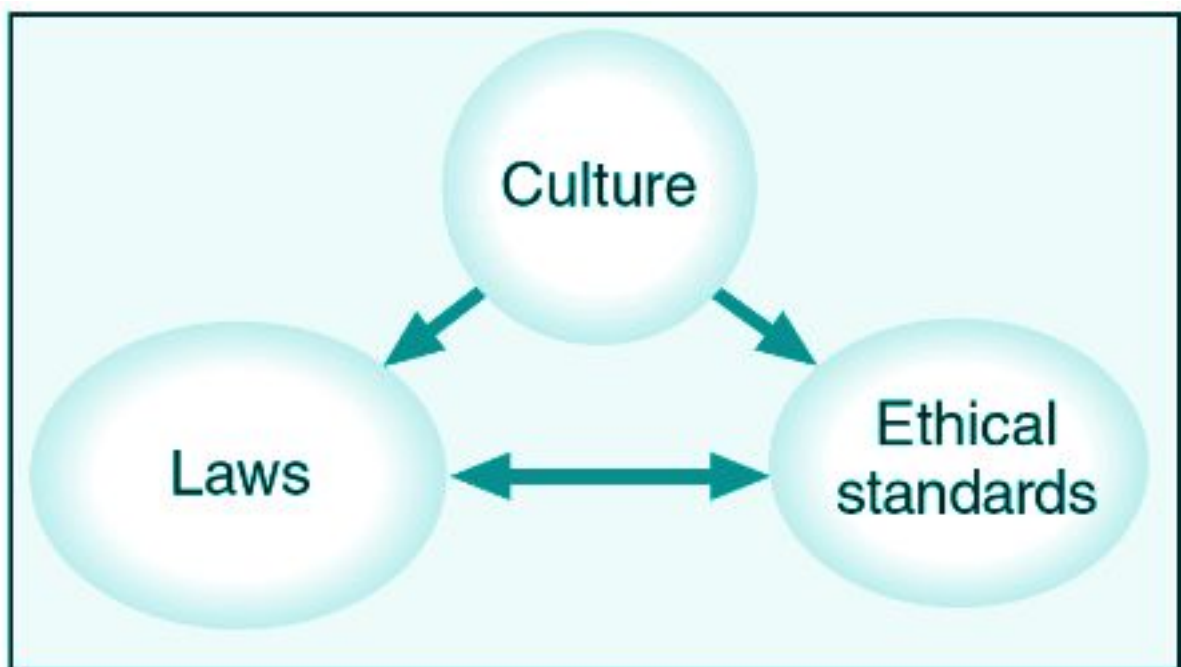


FIGURE 7-1 Culture helps determine laws and ethical standards

- Territorial borders in the physical world serve a useful purpose in traditional commerce: They mark the range of culture and reach of applicable laws very clearly. When people travel across international borders, they are made aware of the transition in many ways.
- Legal scholars define the relationship between geographic boundaries and legal boundaries in terms of four elements: power, effects, legitimacy, and notice.
- **Power**

- ◆ Power is a form of control over physical space and the people and objects that reside in that space, and is a defining characteristic of statehood. For laws to be effective, a government must be able to enforce them. Effective enforcement requires the power both to exercise physical control over residents, if necessary, and to impose sanctions on those who violate the law. The ability of a government to exert control over a person or corporation is called jurisdiction.

→ Effects

- ◆ Laws in the physical world are grounded in the relationship between physical proximity and the effects, or impact, of a person's behavior. Personal or corporate actions have stronger effects on people and things that are nearby than on those that are far away.

→ Legitimacy

- ◆ Most people agree that the legitimate right to create and enforce laws derives from the mandate of those who are subject to those laws. Legitimacy is the idea that those subject to laws should have some role in formulating them. The levels of authority and autonomy with which governments of various countries operate varies significantly from one country to another.

→ Notice

- ◆ Notice is the expression of such a change in rules. People can obey and perceive a law or cultural norm as fair only if they are notified of its existence. Borders provide this notice in the physical world. People receive constructive notice that they have become subject to new laws and cultural norms when they cross an international border, even if they are not specifically warned of the changed laws and norms by a sign or a

border guard's statement. Thus, ignorance of the law is not a sustainable defense, even in a new and unfamiliar jurisdiction.

Jurisdiction on the Internet

- Defining, establishing, and asserting jurisdiction are much more difficult on the Internet than they are in the physical world, mainly because traditional geographic boundaries do not exist.
- The Internet does not provide anything like the obvious international boundary lines in the physical world. Thus, the four considerations that work so well in the physical world—power, effects, legitimacy, and notice—do not translate very well to the virtual world of electronic commerce.
- Governments that want to enforce laws regarding business conduct on the Internet must establish jurisdiction over that conduct.
- A contract is a promise or set of promises between two or more legal entities—people or corporations—that provides for an exchange of value (goods, services, or money) between or among them.
- If either party to a contract does not comply with the terms of the contract, the other party can sue for failure to comply, which is called breach of contract.
- Persons and corporations that engage in business are also expected to exercise due care and not violate laws that prohibit specific actions (such as trespassing, libel, or professional malpractice).
- A tort is an intentional or negligent action (other than breach of contract) taken by a legal entity that causes harm to another legal entity. People or corporations that wish to

enforce their rights based on either contract or tort law must file their claims in courts with jurisdiction to hear their cases.

- A court has sufficient jurisdiction in a matter if it has both subject-matter jurisdiction and personal jurisdiction.

Conflict of Laws

- In the United States, business is governed by federal laws, state laws, and local laws. Sometimes, these laws address the same issues in different ways. Lawyers call this situation a conflict of laws.
- Since online businesses usually serve broad markets that span many localities and many states, they generally look to federal laws for guidance. On occasion, this can lead to problems with state and local laws.

Web Site Content Issues

- A number of legal issues can arise regarding the web page content of electronic commerce sites. The most common concerns involve the use of intellectual property that is protected by other parties' copyrights, patents, trademarks, and service marks.
- **Copyright Infringement**
 - ◆ A copyright is a right granted by a government to the author or creator of a literary or artistic work.
 - ◆ The right is for the specific length of time provided in the copyright law and gives the author or creator the sole and exclusive right to print, publish, or sell the work.
 - ◆ Creations that can be copyrighted include virtually all forms of artistic or intellectual expression—books, music, artworks, recordings (audio and video),

architectural drawings, choreographic works, product packaging, and computer software.

- ◆ In the United States, works created after 1977 are protected for the life of the author plus 70 years. Works copyrighted by corporations or not-for-profit organizations are protected for 95 years from the date of publication or 120 years from the date of creation, whichever is earlier.
- ◆ If an idea cannot be separated from its expression in a work, that work cannot be copyrighted.

→ Patent Infringement

- ◆ A patent is an exclusive right granted by the government to an individual to make, use, and sell an invention.
- ◆ In the United States, patents on inventions protect the inventor's rights for 20 years. A patent on the design for an invention provides protection for 14 years.
- ◆ To be patentable, an invention must be genuine, novel, useful, and not obvious given the current state of technology.
- ◆ The business process patent, which protects a specific set of procedures for conducting a particular business activity, is quite controversial.

→ Trademark Infringement

- ◆ A trademark is a distinctive mark, device, motto, or implement that a company affixes to the goods it produces for identification purposes. A service mark is similar to a trademark, but it is used to identify services provided.
- ◆ The owners of registered trademarks have often invested a considerable amount of money in the development and promotion of their trademarks. Website designers must be very careful not to use any trademarked name, logo, or

other identifying mark without the express permission of the trademark owner.

Domain Names, Cybersquatting, Name Stealing

- ICANN has the duty of overseeing domain name registration. It has implemented strict standards that will allow name assigning to be done with more scrutiny. It has also put solid requirements for domain name recovery in instances of trademark registration lapses by trademark owners. ICANN urges trademark owners to renew their registrations yearly.
- **Cybersquatting** is the practice of registering a domain name that is the trademark of another person or company in the hopes that the owner will pay huge amounts of money to acquire the URL.
- In addition, successful cybersquatters can attract many site visitors and, consequently, charge high advertising rates.
- A related problem, called **name changing**, occurs when someone registers purposely misspelled variations of well-known domain names. These variants sometimes lure consumers who make typographical errors when entering a URL.
- **Name stealing** occurs when someone posing as a site's administrator changes the ownership of the site's assigned domain name to another site and owner. Name stealing is more of a nuisance than a serious problem because the act can be quickly identified and the ownership of the domain name switched back to the rightful owner before significant damage occurs. Once domain name ownership is changed, the name stealer can manipulate the site, post graffiti on it, or redirect online customers to other sites selling substandard goods. The main purpose of name stealing is to harass the site

owner. The temporary loss of its domain name can cut off a business from its website for several days.

- Disputes that arise when one person has registered a domain name that is an existing trademark or company name are settled by the World Intellectual Property Association (WIPO).

Protecting Intellectual Property Online

- Many parts of your website can be protected by different types of intellectual property:
- E-commerce systems, search engines or other technical tools may be protected by patents or utility models.
- Software can be protected by copyrights and/or patents depending on national law.
- Website design and creative website material such as written material, photographs, graphics and music may be protected with copyrights.
- Business names and logos may be protected as trademarks.
- Graphic symbols, UI, and web pages may be protected by industrial design law.
- One promising technique employs steganography to create a digital watermark. The watermark is a digital code or stream embedded undetectably in a digital image or audio file. It can be encrypted to protect its contents, or simply hidden among the bits—digital information—comprising the image or recording.
- Copy control is an electronic mechanism for limiting the number of copies that one can make of a digital work.

Online Crime

- Crime on the Web includes online versions of crimes that have been undertaken for years in the physical world,

including theft, stalking, distribution of pornography, and gambling.

- Other crimes, such as commandeering one computer to launch attacks on other computers, are new.
- Cybercrime may threaten a person or a nation's security and financial health. Issues surrounding these types of crimes have become high-profile, particularly those surrounding hacking, copyright infringement, unwarranted mass-surveillance, child pornography, and child grooming.
- There are also problems of privacy when confidential information is intercepted or disclosed, lawfully or otherwise.

Ethical Issues

Ethics and Web Business Policies

- Web businesses are finding that ethical issues are important to consider when they are making policy decisions.
- An important ethical issue that organizations face when they collect email addresses from site visitors is how the organization limits the use of the email addresses and related information.
- In the early days of the Web, few organizations made any promises to visitors who provided such information. Today, most organizations state their policy on the protection of visitor information, but many do not.
- In the United States, organizations are not legally bound to limit their use of information collected through their websites. They may use the information for any purpose, including the sale of that information to other organizations. This lack of government regulation that might protect site visitor

information is a source of concern for many individuals and privacy rights advocates.

Privacy Rights and Obligations

- The Electronic Communications Privacy Act of 1986 is the main law governing privacy on the Internet today. Of course, this law was enacted before the general public began its wide use of the Internet. The law was written to update existing law that prevented interception of audio signal transmissions so that any type of electronic transmissions (including, for example, fax or data transmissions) would be given the same protections.
- Ethics issues are significant in the area of online privacy because laws have not kept pace with the growth of the Internet and the Web. The nature and degree of personal information that websites can record when collecting information about visitors' page-viewing habits, product selections, and demographic information can threaten the privacy rights of those visitors. This is especially true when companies lose control of the data they collect on their customers (and other people).
- The Internet has also changed traditional assumptions about privacy because it allows people anywhere in the world to gather data online in quantities that would have been impossible a few years ago.
- Differences in cultures throughout the world have resulted in different expectations about privacy in electronic commerce.
- Most companies that gather personal information in the course of doing business on the Web would like to be able to use that information for any purpose of their own.

- Some companies would also like to be able to sell or rent that information to other companies.
- The most common policy used in U.S. companies today is an opt-out approach. In an opt-out approach, the company collecting the information assumes that the customer does not object to the company's use of the information unless the customer specifically chooses to deny permission (that is, to opt out of having their information used).
- In the less common opt-in approach, the company collecting the information does not use the information for any other purpose (or sell or rent the information) unless the customer specifically chooses to allow that use (that is, to opt in and grant permission for the use).
- Until the legal environment of privacy regulation becomes more clear, privacy advocates recommend that electronic commerce websites be conservative in their collection and use of customer data.
- Mark Van Name and Bill Catchings, writing in PC Week in 1998, outlined four principles for handling customer data that provide a good outline for website administrators even today. These principles are as follows:
 - ◆ Use the data collected to provide improved customer service.
 - ◆ Do not share customer data with others outside your company without the customer's permission.
 - ◆ Tell customers what data you are collecting and what you are doing with it.
 - ◆ Give customers the right to have you delete any of the data you have collected about them.
- Today, we might add to this list a recommendation that customer data, once collected, be kept as secure as possible. A

number of organizations are active in promoting privacy rights.

Communications with Children

- An additional set of privacy considerations arises when websites attract children and engage in some form of communication with those children.
- Adults who interact with websites can read privacy statements and make informed decisions about whether to communicate personal information to the site.
- The communication of private information (such as credit card numbers, shipping addresses, and so on) is a key element in the conduct of electronic commerce.
- The laws of most countries and most sets of ethics consider children to be less capable than adults in evaluating information sharing and transaction risks. Thus, we have laws in the physical world that prevent or limit children's ability to sign contracts, get married, drive motor vehicles, and enter certain physical spaces (such as bars, casinos, tattoo parlors, and race tracks).
- Children are considered to be less able (or unable) to make informed decisions about the risks of certain activities. Similarly, many people are concerned about children's ability to read and evaluate privacy statements and then consent to providing personal information to websites.
- Under the laws of most countries, people under the age of 18 or 21 are not considered adults. However, those countries that have proposed or passed laws that specify differential treatment for the privacy rights of children often define "child" as a person below the age of 12 or 13. This complicates the issue because it creates two classes of non-adults.

- In the United States, Congress enacted the **Children's Online Protection Act (COPA)** in 1998 to protect children from "material harmful to minors." This law was held to be unconstitutional because it unnecessarily restricted access to a substantial amount of material that is lawful, thus violating the First Amendment.
- Congress was more successful with the **Children's Online Privacy Protection Act of 1998 (COPPA)**, which provides restrictions on data collection that must be followed by electronic commerce sites aimed at children. This law does not regulate content, as COPA attempted to do, so it has not been successfully challenged on First Amendment grounds.
- In 2001, **Congress enacted the Children's Internet Protection Act (CIPA)**. The CIPA requires schools that receive federal funds to install filtering software on computers in their classrooms and libraries. Filtering software is used to block access to adult content websites. In 2003, the Supreme Court held that the CIPA was constitutional. Companies with websites that appeal to non-adults must be careful to comply with the laws governing their interactions with these young visitors.

Taxation and Electronic Commerce

Taxes on the Internet

- Companies that do business on the Web are subject to the same taxes as any other company. However, even the smallest Web business can become instantly subject to taxes in many states and countries because of the Internet's worldwide scope.

- Traditional businesses may operate in one location and be subject to only one set of tax laws for years. By the time those businesses are operating in multiple states or countries, they have developed the internal staff and record-keeping infrastructure needed to comply with multiple tax laws.
- Firms that engage in electronic commerce must comply with these multiple tax laws from their first day of existence. An online business can become subject to several types of taxes, including income taxes, transaction taxes, and property taxes.
- Income taxes are levied by national, state, and local governments on the net income generated by business activities.
- Transaction taxes, which include sales taxes, use taxes, excise taxes, and customs duties, are levied on the products or services that the company sells or uses.
- Customs duties are taxes levied by the United States and other countries on certain commodities when they are imported into the country.
- Property taxes are levied by states and local governments on the personal property and real estate used in the business.
- In general, the taxes that cause the greatest concern for Web businesses are income taxes and sales taxes.

U.S. Income Taxes

- The Internal Revenue Service (IRS) is the U.S. government agency charged with administering the country's tax laws.
- A basic principle of the U.S. tax system is that any verifiable increase in a company's wealth is subject to federal taxation. Thus, any company whose U.S.-based website generates income is subject to U.S. federal income tax.

- Furthermore, a website maintained by a company in the United States must pay federal income tax on income generated outside of the United States. To reduce the incidence of double taxation of foreign earnings, U.S. tax law provides a credit for taxes paid to foreign countries.
- Most states levy an income tax on business earnings. If a company conducts activities in several states, it must file tax returns in all of those states and apportion its earnings in accordance with each state's tax laws.
- In some states, the individual cities, counties, and other political subdivisions within the state also have the power to levy income taxes on business earnings.
- Companies that do business in multiple local jurisdictions must apportion their income and file tax returns in each locality that levies an income tax. The number of taxing authorities (which includes states, counties, cities, towns, school districts, water districts, and many other governmental units) in the United States exceeds 30,000. Companies that sell through their websites do not, in general, establish nexus everywhere their goods are delivered to customers.
- Usually, a company can accept orders and ship from one state to many other states and avoid nexus by using a contract carrier such as FedEx or United Parcel Service to deliver goods to customers.

U.S. State Sales Taxes

- Most states levy a transaction tax on goods sold to consumers. This tax is usually called a sales tax.
- Businesses that establish nexus with a state must file sales tax returns and remit the sales tax they collect from their customers.

- If a business ships goods to customers in other states, it is not required to collect sales tax from those customers unless the business has established nexus with the customer's state.
- However, the customer in this situation is liable for payment of a use tax in the amount that the business would have collected as sales tax if it had been a local business.
- A use tax is a tax levied by a state on property used in that state that was not purchased in that state. Most states' use tax rates are identical to their sales tax rates.
- In addition to property purchased in another state, use taxes are assessed on property that is not "purchased" at all.
- Larger businesses use complex software to manage their sales tax obligations. Not only are the sales tax rates different in the 7500 U.S. sales tax jurisdictions (which include states, counties, cities, and other sales tax authorities), but the rules about which items are taxable differ.
- Some purchasers are exempt from sales tax, such as certain charitable organizations and businesses buying items for resale. Thus, to determine whether a particular item is subject to sales tax, a seller must know where the customer is located, what the laws of that jurisdiction say about taxability and tax rate, and the taxable status of the customer.
- Many of the states have joined together through the National Governor's Association and the National Conference of State Legislatures to create the Streamlined Sales and Use Tax Agreement (SSUTA). The SSUTA simplifies state sales taxes by making the various state tax codes more congruent with each other while allowing each state to set its own rates. Each state must adopt the agreement, and once a state does adopt it, companies in the state can choose one of several simple procedures for collecting and remitting sales taxes nationwide.

European Union Value Added Taxes

- The United States raises most of its revenue through income taxes. Other countries, especially those in the European Union (EU), use transfer taxes to generate most of their revenues.
- The Value Added Tax (VAT) is the most common transfer tax used in these countries. A VAT is assessed on the amount of value added at each stage of production.
- For example, if a computer keyboard manufacturer purchased keyboard components for \$20 and then sold finished keyboards for \$50, the value added would be \$30. VAT is collected by the seller at each stage of the transaction.
- For example, a product that goes through five different companies on its way to the ultimate consumer would have VAT assessed on each of the five sales.
- In most countries, the VAT is calculated at the time of each intermediate sale and remitted to the country in which that sale occurs. The EU enacted legislation concerning the application of VAT to sales of digital goods that became effective in mid-2003.
- Companies based in EU countries must collect VAT on digital goods no matter where in the EU the products are sold. This legislation has attracted the attention of companies based outside of the EU that sell digital goods to consumers based in one or more EU countries.
- Under the law, non-EU companies that sell into the EU must now register with EU tax authorities and levy, collect, and remit VAT if their sales include digital goods delivered into the EU.

